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HARVEST ESTIMATES FOR SELECTED  
MARINE BOAT SPORT FISHERIES IN  
SOUTHEAST ALASKA IN 1989<sup>1</sup>

By

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# TABLE OF CONTENTS

|   | <u>Page</u> |
|---|-------------|
| LIST OF TABLES . . . . .  | iii         |
| LIST OF FIGURES . . . . .                                       | v           |
| LIST OF APPENDICES . . . . .                                    | vi          |
| ABSTRACT . . . . .  | 1           |
| INTRODUCTION . . . . .  | 2           |
| OBJECTIVES . . . . .  | 4           |
| METHODS . . . . .   | 5           |
| Study Design . . . . .  | 5           |
| Direct Expansion Creel Survey . . . . .                         | 5           |
| Count Creel Survey . . . . .                                    | 7           |
| Data Collection . . . . .                                       | 7           |
| Harvest Estimate Data Analysis . . . . .                        | 8           |
| Direct Expansion Creel Surveys . . . . .                        | 8           |
| Count Type Creel Surveys . . . . .                              | 14          |
| Assumptions . . . . .   | 18          |
| Contributions of Coded-Wire Tagged Stocks . . . . .             | 18          |
| Chinook Salmon Age Composition and Mean Length at Age . . . . . | 18          |
| Pacific Halibut Size and Weight Composition . . . . .           | 19          |
| RESULTS . . . . .   | 19          |
| Angler Effort . . . . .   | 19          |
| Chinook Salmon Fisheries . . . . .                              | 19          |
| Coho Salmon Fisheries . . . . .                                 | 22          |
| Bottomfish Fisheries . . . . .                                  | 28          |
| Other Salmonid Fisheries . . . . .                              | 28          |
| Shellfish Fisheries . . . . .                                   | 33          |

# TABLE OF CONTENTS (Continued)

|   | <u>Page</u> |
|---|-------------|
| DISCUSSION . . . . .                      | 33          |
| Angler Effort . . . . .                   | 33          |
| Chinook Salmon Fisheries . . . . .        | 37          |
| Coho Salmon Fisheries . . . . .           | 41          |
| Bottomfish Fisheries . . . . .            | 41          |
| Shellfish Fisheries . . . . .             | 41          |
| CONCLUSIONS AND RECOMMENDATIONS . . . . . | 48          |
| ACKNOWLEDGEMENTS . . . . .                | 48          |
| LITERATURE CITED . . . . .                | 50          |
| APPENDIX A . . . . .                      | 53          |
| APPENDIX B . . . . .                      | 56          |
| APPENDIX C . . . . .                      | 62          |

# LIST OF TABLES

| <u>Table</u>  | <u>Page</u> |
|---|-------------|
| 1. Summary of estimated angler effort by target species for sampled marine sport fisheries of southeast Alaska during 1989 . . . . .  | 20          |
| 2. Summary of estimated catches and harvests of chinook salmon in sampled marine sport fisheries of southeast Alaska during 1989 . .  | 21          |
| 3. Contributions of hatchery chinook salmon to the major marine sport fisheries of southeast Alaska, 1989 . . . . .   | 23          |
| 4. Summary of estimated effort and catches and harvests of chinook salmon in terminal harvest areas near Juneau, Ketchikan, and Petersburg opened by regulatory action to the harvest of small chinook salmon . . . . . | 24          |
| 5. Summary of the age composition of chinook salmon sampled in selected marine sport fisheries of southeast Alaska during 1989 . . . . .  | 25          |
| 6. Summary of estimated harvests and catches of coho salmon in sampled marine sport fisheries of southeast Alaska during 1989 . . . . .   | 26          |
| 7. Harvest rates for coho salmon (harvest per angler-hour of effort) by seasonal period in the Ketchikan and Juneau marine boat fisheries during 1989 . . . . .   | 27          |
| 8. Contributions of hatchery coho salmon to the Ketchikan and Juneau marine sport fisheries of southeast Alaska, 1989 . . . . .   | 29          |
| 9. Summary of estimated harvests of Pacific halibut, rockfish, and lingcod in sampled marine sport fisheries of southeast Alaska during 1989 . . . . .  | 30          |
| 10. Average lengths, round weights, and total round weight for Pacific halibut harvested by selected marine sport fisheries of southeast Alaska during 1989 . . . . .   | 31          |
| 11. Rockfish species composition in the Ketchikan and Sitka marine sport fisheries during 1989 . . . . .  | 32          |
| 12. Summary of estimated harvests of pink salmon, chum salmon, sockeye salmon, and Dolly Varden in sampled marine sport fisheries of southeast Alaska during 1989 . . . . .   | 34          |
| 13. Estimated effort for, and harvests of, Dungeness, king, and tanner crab and shrimp in major boat personal use, sport, and subsistence fisheries of southeast Alaska during 1989 . . . . .                           | 35          |
| 14. Estimated angler effort in the Juneau and Ketchikan marine sport fisheries as determined by on-site creel surveys for comparable sample periods . . . . .   | 36          |

# LIST OF TABLES (Continued)

| <u>Table</u>   | <u>Page</u> |
|--|-------------|
| 15. Estimated angler effort in the Petersburg, Wrangell, Sitka, and Haines sport fisheries as determined by on-site creel surveys for comparable sample periods . . . . .          | 38          |
| 16. Estimated harvests of chinook salmon in selected marine sport fisheries of southeast Alaska as determined by on-site creel surveys for comparable sample periods . . . . .     | 39          |
| 17. Estimated contributions of hatchery produced chinook salmon to selected marine sport fisheries of southeast Alaska as determined by on-site creel surveys, 1983-1989 . . . . . | 40          |
| 18. Estimated harvests of coho salmon in the Juneau and Ketchikan marine sport fisheries as determined by on-site creel surveys for comparable sample periods . . . . .            | 42          |
| 19. Estimated contributions of hatchery produced coho salmon to the Juneau and Ketchikan marine sport fisheries as determined by on-site creel surveys . . . . .                   | 43          |
| 20. Estimated harvests and catches of Pacific halibut in the Juneau and Ketchikan marine sport fisheries, 1983-1989 . . . . .  | 44          |
| 21. Comparative catch and effort statistics for the Ketchikan and Sitka rockfish sport fisheries . . . . .   | 45          |
| 22. Species composition of the rockfish harvest in the Ketchikan and Sitka sport fisheries for comparable time periods, 1987-1989 . . .  | 46          |
| 23. Comparison of estimated shellfish effort and harvest between 1988 and 1989 for the Juneau and Ketchikan marine boat fisheries. . . .   | 47          |

## LIST OF FIGURES

| <u>Figure</u>   | <u>Page</u> |
|---|-------------|
| 1. Communities in southeast Alaska where sport fish creel surveys are conducted . . . . . | 3           |

## LIST OF APPENDICES

| <u>Appendix</u>  | <u>Page</u> |
|--|-------------|
| APPENDIX A - SPECIAL CHINOOK SALMON REGULATIONS FOR 1989   |             |
| A1. Special regulations affecting the taking of chinook salmon in<br>southeastern Alaska sport fisheries during 1989 . . . . .                             | 54          |
| APPENDIX B - SAMPLING STRATIFICATION STRUCTURE   |             |
| B1. Sampling stratification structure used in southeast marine creel<br>surveys during 1989 . . . . .  | 57          |
| APPENDIX C - CREEL SURVEY STATISTICS   |             |
| C1. Estimated finfish effort and catches for the Ketchikan marine boat<br>sport fishery, 24 April - 24 September 1989 . . . . .                            | 63          |
| C2. Estimated finfish effort and catches for the Ketchikan marine boat<br>sport fishery by seasonal period, 24 April - 24 September 1989 . .               | 64          |
| C3. Estimated finfish effort and catches for the Petersburg marine boat<br>sport fishery, 10 April - 16 July 1989 . . . . .                                | 66          |
| C4. Estimated finfish effort and catches for the Petersburg marine boat<br>sport fishery by seasonal period, 10 April - 16 July 1989 . . . . .             | 67          |
| C5. Estimated finfish effort and catches for the Wrangell marine boat<br>sport fishery, 24 April - 16 July 1989 . . . . .                                  | 68          |
| C6. Estimated finfish effort and catches for the Wrangell marine boat<br>sport fishery by seasonal period, 24 April - 16 July 1989 . . . . .               | 69          |
| C7. Estimated finfish effort and catches for the Sitka marine boat sport<br>fishery, 24 April - 02 July 1989 . . . . .                                     | 70          |
| C8. Estimated finfish effort and catches for the Sitka marine boat sport<br>fishery by seasonal period, 24 April - 2 July 1989 . . . . .                   | 71          |
| C9. Estimated finfish effort and catches for the Juneau marine boat<br>sport fishery, 24 April - 24 September 1989 . . . . .                               | 73          |
| C10. Estimated finfish effort and catches for the Juneau marine boat<br>recreational fishery by seasonal period, 24 April - 24 September<br>1989 . . . . . | 74          |
| C11. Estimated finfish effort and catches for the Haines marine boat<br>sport fishery, 24 April - 25 June 1989 . . . . .                                   | 76          |

## ABSTRACT

Creel surveys of six major marine boat sport fisheries in southeast Alaska were conducted during 1989. Dockside interviews of boat parties completing trips were used to estimate effort for and harvest of Pacific salmon and trout *Oncorhynchus* species, Pacific halibut *Hippoglossus stenolepis*, rockfish *Sebastes* species, and Dolly Varden *Salvelinus malma*. In addition, harvests of crab were estimated and in Ketchikan, harvest of shrimp was also estimated. The contributions of hatchery chinook salmon *Oncorhynchus tshawytscha* and coho salmon *Oncorhynchus kisutch* to these sport fisheries were estimated from coded-wire tag recovery information. Scale samples and lengths were taken from chinook salmon caught by marine recreational anglers for age and size composition estimates. Lengths of Pacific halibut *Hippoglossus stenolepis* were taken to estimate total round weight of the Pacific halibut harvest from existing length-weight relationships.

An estimated 20,044 chinook salmon, 34,705 coho salmon, 31,295 pink salmon *Oncorhynchus gorbuscha*, 28,256 Pacific halibut, and 13,488 rockfish were harvested in the boat fisheries surveyed. Harvests of chinook salmon were above average in all areas except Haines, where harvests were only 21 percent of average. In Sitka, harvest of chinook salmon was nearly 3 times that of the past few years for a comparable time period. Hatcheries produced about 30 percent of the chinook salmon harvest. The highest number of hatchery fish was taken in Ketchikan where an estimated 52 percent of the harvest was of hatchery origin. In Juneau, the harvest of coho salmon was the highest on record while in Ketchikan, coho salmon harvest was below average. Hatcheries produced 11 percent and 4 percent of the coho salmon harvest in Ketchikan and Juneau. Pacific halibut harvests were below average in Juneau and above average in Ketchikan. Total rockfish harvest in Ketchikan is declining due primarily to decreases in the harvest of quillback rockfish *Sebastes maliger*. Crab harvest in the monitored fisheries totaled 12,896 Dungeness crab *Cancer magister*, 3,500 Tanner crab *Chionoecetes* species, and 1,849 king crab *Paralithodes* species.

KEY WORDS: Creel survey, angler effort and harvest, harvest per unit effort, age composition, length at age estimation, round weight, boat sport fishery, derby, hatchery, enhancement, coded-wire tag, chinook salmon, *Oncorhynchus tshawytscha*, coho salmon, *Oncorhynchus kisutch*, pink salmon, *Oncorhynchus gorbuscha*, Pacific halibut, *Hippoglossus stenolepis*, Dolly Varden, *Salvelinus malma*, rockfish, *Sebastes*, Juneau, Ketchikan, Petersburg, Wrangell, Haines, Sitka, southeast Alaska.

## INTRODUCTION

The waters of southeast Alaska support important commercial, sport, personal use, and subsistence fisheries for a variety of salmonid, bottomfish, and shellfish species. The largest sport fishery in southeast Alaska is the Juneau marine boat fishery, but other important marine boat fisheries occur around Ketchikan, Sitka, Petersburg, Wrangell, and Haines (Figure 1).

Creel survey information from the marine sport fisheries is used for a variety of management and reporting purposes. The U.S./Canada Pacific Salmon Treaty requires careful monitoring of commercial and recreational harvests of chinook salmon *Oncorhynchus tshawytscha*. In-season and post-season estimates of the harvests of wild and hatchery chinook salmon by marine sport fisheries in southeast Alaska are needed to monitor Alaska's compliance with catch limits established by the Treaty. Monitoring of the marine fisheries is also needed to evaluate hatchery contributions to the coho salmon *Oncorhynchus kisutch* harvest.

Harvest rate data for coho salmon in marine boat recreational fisheries, along with harvest rate data from commercial troll and net fisheries, are used to monitor the relative abundance and migratory patterns of coho salmon into inside waters. Pacific halibut *Hippoglossus stenolepis* harvest information is provided to the International Pacific Halibut Commission (IPHC) during their consideration of proposed modifications to sport fishing regulations.

Sport regulations were generally identical to those presented in Suchanek and Bingham (1989), but some sport regulation changes passed by the Alaska Board of Fisheries during their March 1989 meeting took effect in early June. One of the new regulations was designed to increase harvests of hatchery chinook salmon by allowing harvests of chinook salmon of any size in terminal harvest areas opened by emergency order. The bag limit within these terminal areas was increased to 2 chinook salmon less than 28 inches (71 cm) in length and 2 chinook salmon 28 inches or more in total length. Areas opened by emergency order within day-trip distance of surveyed fisheries are described and discussed in Appendix A. The general bag limit for chinook salmon within fisheries outside of the terminal areas was restricted to 2 per day, 2 in possession with a 28 inch size limit. The taking of chinook salmon less than 28 inches in total length was prohibited outside of the terminal harvest areas. Previous regulations had allowed the harvest of chinook salmon less than 28 inches if they were tagged or were missing their adipose fin.

The size of the area near Juneau closed to the taking of chinook salmon during the period from 16 April to 14 June was substantially reduced in 1989. This closure is designed to limit the harvest of mature chinook salmon destined for the Taku River. In 1989, the area closed to chinook salmon fishing was limited to Taku Inlet north of a line from Point Bishop east to the mouth of Dorothy Creek. In the Haines area, however, additional special regulations designed to limit the sport harvest of chinook salmon bound for the Chilkat River were placed into effect (Appendix A).

General bag limits for salmon species other than chinook salmon remained 6 fish per day, 12 in possession for fish 16 inches (41 cm) or more in length. The Pacific halibut bag limit also remained 2 fish per day, 4 in possession. A regionwide rockfish bag limit was placed into effect in 1989. Anglers were limited to 5 rockfish per day, 10 in possession only 2 (4 in possession) of which could be yelloweye rockfish. Areas adjacent to Ketchikan and Sitka were further

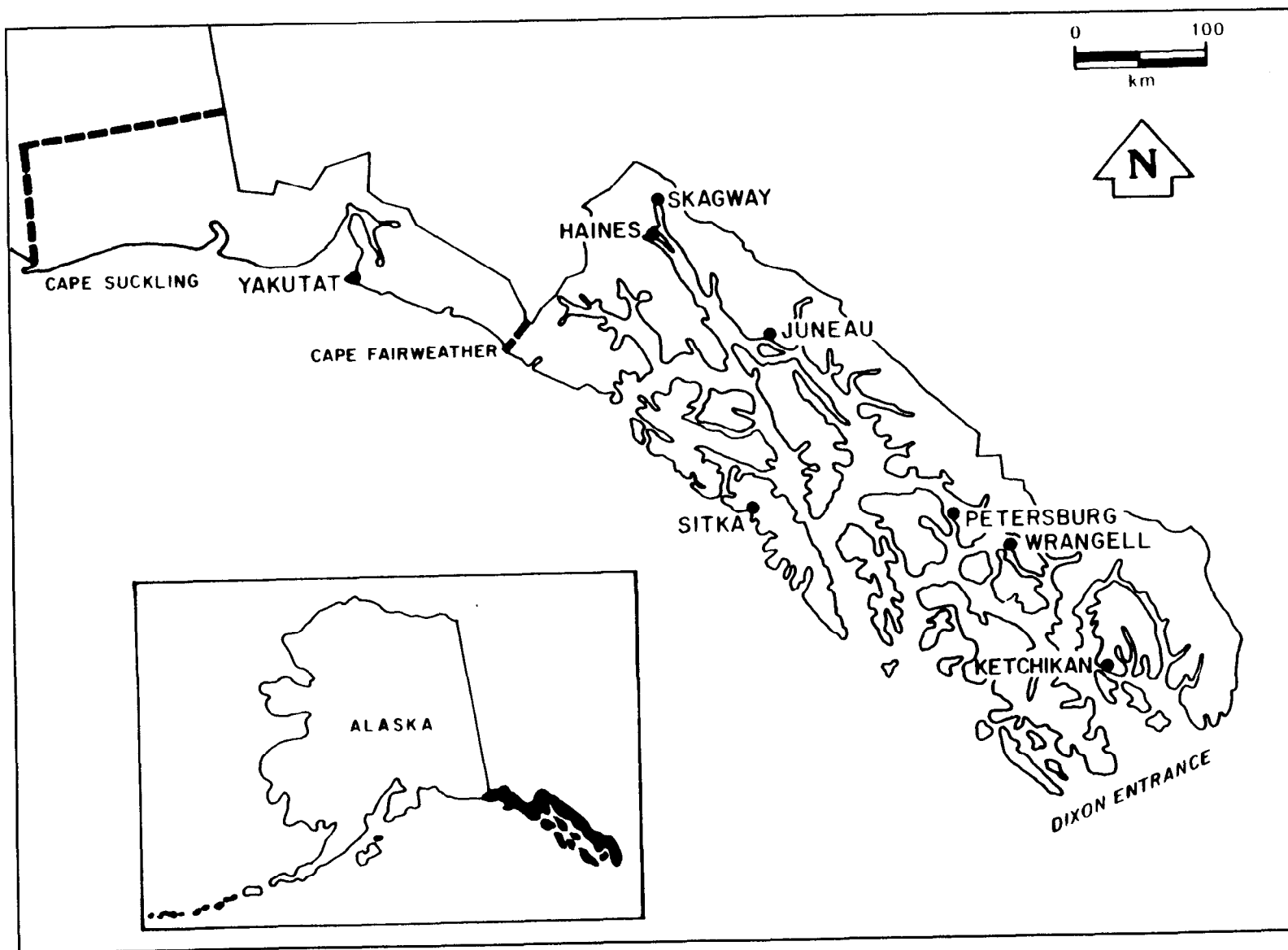


Figure 1. Communities in southeast Alaska where sport fish creel surveys are conducted.

restricted to a rockfish bag and possession limit of 3 fish per day, only 1 of which could be a yelloweye rockfish.

Sport regulations for the harvest of crab and other shellfish in southeast Alaska also went into effect in 1989. In practice, these regulations applied only to non-residents of Alaska. Residents were still allowed to take shellfish under personal use or subsistence regulations, which were little changed. The personal use and subsistence regulations for the harvest of crab in southeast Alaska have been summarized by Suchanek and Bingham (1989). Sport regulations did not allow the harvest of king crab, and the aggregate Dungeness and Tanner crab bag limit was 5 male crab per day or in possession. The minimum size limit for Dungeness crab was 6.5 inches (16.5 cm), while the Tanner crab size limit was 5.5 inches (14.0 cm). Although there is no limit on the personal use or subsistence harvest of shrimp, sport regulations limited the take of shrimp to 10 pounds (4.5 kg) or 10 quarts (9.5 l) per day or in possession.

This report presents the findings of harvest surveys of marine boat recreational fisheries conducted in 1989, by the Division of Sport Fish of the Alaska Department of Fish and Game (ADF&G), in the Ketchikan, Petersburg, Wrangell, Sitka, Juneau, and Haines areas. Results from harvest surveys associated with a variety of roadside marine and freshwater sport fisheries in the Juneau, Haines, and Yakutat areas are presented in other reports.

#### OBJECTIVES

The specific objectives for the 1989 marine boat harvest surveys were:

1. To estimate the total sport angler effort, catch, and harvest of Pacific salmon, Pacific halibut, rockfish *Sebastes* spp., trout, Dolly Varden *Salvelinus malma*, and lingcod *Ophiodon elongatus* in the following marine boat sport fisheries during the listed time periods:

| <u>Fishery</u> | <u>Time Period</u>           |
|----------------|------------------------------|
| Juneau         | 24 April - 24 September 1989 |
| Ketchikan      | 24 April - 24 September 1989 |
| Sitka          | 24 April - 02 July 1989      |
| Petersburg     | 10 April - 16 July 1989      |
| Wrangell       | 24 April - 16 July 1989      |
| Haines         | 24 April - 25 June 1989      |

2. To estimate the contribution of hatchery chinook and coho salmon by coded-wire tag lot for the fisheries and time periods listed in Objective 1.
3. To estimate biweekly harvest rates for coho salmon in the Juneau, and Ketchikan fisheries for the time periods listed in Objective 1.
4. To estimate the age composition and mean length-at-age of the chinook salmon harvest for the fisheries and time periods listed in Objective 1.
5. To estimate the total round weight of Pacific halibut harvested for the fisheries and time periods listed in Objective 1.

6. To estimate the major species composition of the rockfish harvest in the Ketchikan and Sitka fisheries for the time periods listed in Objective 1.
7. To estimate the combined personal use, subsistence, and sport effort and harvest of Dungeness crab *Cancer magister*, Tanner crab *Chionoecetes* spp. and king crab *Paralithodes* spp. landed during the fisheries and time periods listed in Objective 1.

## METHODS

### Study Design

Six separate creel surveys of marine boat sport fisheries were conducted in southeast Alaska during 1989. Site descriptions and maps of the Juneau, Ketchikan, Sitka, Petersburg, Wrangell, and Haines fisheries can be found in Bingham, et al. (1988).

#### Direct Expansion Creel Survey:

The primary sampling design used for the marine boat surveys was a modified direct expansion creel survey. This design is based on sampling major access points into the fishery to interview boat parties that had completed fishing trips. The estimates obtained from these surveys represent the effort and harvest by boat-parties that returned to the sampled access locations and may not represent the entire fishery, as a few boats return to unsampled private moorages, docks, or unimproved access points. Some boats may also return at times when the harbors are not sampled (i.e., the middle of the night). In all instances, at least 90% of the fishery harvest and effort was thought to be produced by anglers using the access locations and during the time periods covered.

During the surveys, interviews of boat-parties provided effort, harvest, and harvest rate information. Effort and harvest information was recorded only for boat-parties and not for individual anglers. Efforts and harvests by all boat-parties interviewed during the sample periods were expanded to include periods of time and access locations that were not sampled.

Harvest estimates were made for a maximum of 12 seasonal time periods, each of two weeks in length, starting on 10 April and ending on 24 September. Some surveys were conducted only for a portion of the 1989 season. In the Haines area, harvest estimates were made weekly (Monday through Sunday) during the period from 24 April to 25 June so that the chinook salmon harvest could be monitored very closely. In some communities, major salmon derby harvests were estimated separately from the biweekly time period harvest estimate.

In general, each marine fishery was stratified for sampling within each biweekly period according to the following set of hierarchical criteria:

1. Type of fishing day:

- a. weekday (Monday-Friday); and

- b. weekend-holiday (Saturday, Sunday, and legal holidays including Canadian holidays in the Haines area).

2. Time of day:

- a. early day (defined as starting at 0700 and ending mid-way to the end of civil twilight); and
- b. late day (starting mid-way between 0700 and civil twilight and ending at the end of civil twilight).

3. Access type:

- a. heavy use: harbors and boat ramps receiving a relatively "large" amount of angler effort and harvest; and
- b. low use: harbors and boat ramps receiving a relatively "small" amount of angler effort and harvest.

Samples were then allocated to these strata according to the following general scheme:

1. Within any week (i.e., Monday-Sunday), all weekend-holidays were selected for sampling.
2. Two contiguous weekdays were randomly selected for each staff member for "non-sampling", in order to assure two days off for staff. All remaining weekdays were sampled.
3. Either an early or late time-of-day stratum was sampled each man-day. In Ketchikan, the time-of-day stratum was not further subdivided. In other areas, however, the time-of-day stratum was further subdivided into two sampling periods. The two periods included all the time during each time-of-day stratum up to a maximum of 7.5 hours, except for the time necessary to travel between sampling locations. During each selected time-of-day stratum, both of the two periods were sampled.
4. Samples were allocated to access-type strata in proportion to the approximate amount of effort landed within the strata during 1988. A minimum sample size of two was allocated for each unique stratum during each biweekly period.
5. For each of the sampling periods in an access-type stratum, one of the possible access points was selected at random for sampling. The number of hours sampled during a day was further constrained to reduce personnel costs by minimizing overtime. The time sampled was limited to about 7.25 hours and then start times were randomly selected within a sampling period.

Specific details of sampling stratifications and allocations for each of the six fisheries surveyed are found in Appendix B.

In addition to these surveys, the managers of two sport fishing lodges on Shelter Island near Juneau agreed to voluntarily report the sport harvests of boats fishing from the lodges. Since this fishing effort could not be easily monitored with normal creel surveys, the information proved very valuable. Shelter Island lodge harvests were grouped with the rest of the Juneau sport fishery, as the lodge boats usually fished areas used by other Juneau marine anglers.

### Count Creel Survey:

A count type creel survey (Neuhold and Lu 1957) was used during major salmon derbies in Juneau, Ketchikan, Sitka, and Petersburg:

| <u>Derby Location</u>            | <u>Dates</u>                       |
|----------------------------------|------------------------------------|
| Juneau Golden North Salmon Derby | 4-6 August 1989                    |
| Ketchikan King Salmon Derby      | 27-29 May, 3-4 and 10-11 June 1989 |
| Sitka Salmon Derby               | 27-29 May, 3-4 June 1989           |
| Petersburg King Salmon Derby     | 26-29 May 1989                     |

Due to conservation concerns for chinook salmon, there was no Haines King Salmon Derby during 1989.

A count type design works better in these intense fisheries than a direct expansion design due to manpower constraints. Aerial boat counts during the derby provided angler effort information. These aerial counts of boats were considered to be instantaneous and to reflect fishing effort at the time of the count. Aerial surveys took approximately 0.75 to 1.5 hours in most areas, but they took about 3.0 hours in Ketchikan. Two times for aerial counts per derby day were randomly selected during derby hours. Effort in boat-hours was estimated by multiplying the average boat count by the number of hours available for fishing in the time periods associated with the counts. The harvest per unit effort (HPUE) expressed in harvest per boat-hour for each species of fish was estimated from interviews of boat-parties that had completed their fishing trips. The estimated harvest was obtained from the product of the effort and HPUE estimates.

### Data Collection

The following information was collected for each boat-party interviewed:

1. The number of rods fished;
2. the number of hours fished for the targets of either salmon, halibut, rockfish, or lingcod (effort was recorded separately if different targets were fished);
3. for each type of targeted fishing, the number of each fish species that were kept and the number released during this effort;
4. if sport, personal use, or subsistence effort was expended for crab (and additionally for shrimp in the Ketchikan area), the number of pots or rings fished;
5. if crab effort occurred, the number of Dungeness, tanner, or king crab harvested (numbers of crab released were not recorded);

6. the general area fished for the different target species including crab or shrimp (hours fished were recorded separately if different areas were fished); and
7. whether the fishing trip was a charter (i.e., if the angler hired a licensed operator) or a personal boat trip.

All harvests of Pacific salmon, Pacific halibut, steelhead *O. mykiss*, cutthroat trout *O. clarki*, Dolly Varden, lingcod, kelp greenling *Hexagrammos decagrammus*, and rockfish were documented. Chinook salmon less than 28 inches (71 cm) in total length were categorized as small chinook salmon, while those at least 28 inches in total length were categorized as large chinook salmon. In Ketchikan and Sitka, rockfish harvests were identified as time allowed using Kramer and O'Connell (1988) to identify the following species: black rockfish *S. melanops*, copper rockfish *S. caurinus*, dusky rockfish *S. ciliatus*, quillback rockfish *S. maliger*, yelloweye rockfish *S. ruberrimus*, and yellowtail rockfish *S. flavidus*. Silvergrey rockfish *S. brevispinus* were an additional species distinguished in Ketchikan, while in Sitka, bocaccio *S. paucispinis* were also identified. If the rockfish harvested were not any of the above species, they were recorded in an "other rockfish" category.

Harvested chinook and coho salmon were also checked for missing adipose fins. Chinook salmon were measured to the nearest 5 mm and scale samples were taken from the preferred area above the lateral line (INPFC 1963). Harvested Pacific halibut were measured to the nearest 5 mm (total length).

#### Harvest Estimate Data Analysis

Direct Expansion Creel Surveys:

The following equations were used for estimation of harvest and effort for the direct expansion completed-trip interview creel surveys conducted during the non-derby periods at each fishery:

$$\begin{aligned}\hat{E}_h &= \text{estimated boat-hours expended in stratum } h \text{ (as determined by} \\ &\quad \text{unique combinations of harbor type, biweekly period, type of} \\ &\quad \text{day, and time of day) of each fishery;} \\ &= R_h \frac{\bar{e}_h}{\bar{r}_h};\end{aligned}\tag{1}$$

where:

$$R_h = \text{total number of hours in stratum } h, \text{ defined by the number of} \\ \text{hours available for boat-parties to return to access} \\ \text{locations;}$$

$\bar{e}_h$  = mean of the estimated effort (in boat-hours) expended by boat-parties interviewed in stratum  $h$ ;

$$= \frac{\sum_{i=1}^{n_h} \hat{e}_{hi}}{n_h}; \quad (2)$$

$n_h$  = number of samples collected within stratum  $h$ ;

$\hat{e}_{hi}$  = estimated effort for sample  $i$  within stratum  $h$ ;  
 $= O_{hi} \bar{e}_{hi}$ ; (3)

$O_{hi}$  = number of boats counted in sample  $i$  within stratum  $h$  (including interviewed boats and "missed" boats);  
 $= O_{hi} + P_{hi}$ ; (4)

$O_{hi}$  = number of boat-parties interviewed during sample  $i$  within stratum  $h$ ;

$P_{hi}$  = number of boat-parties not interviewed (i.e., "missed") during sample  $i$  within stratum  $h$ ;

$\bar{e}_{hi}$  = mean effort expended by boats interviewed during sample  $i$  within stratum  $h$ ;

$$= \frac{\sum_{j=1}^{O_{hi}} e_{hij}}{O_{hi}}; \quad (5)$$

$e_{hij}$  = effort (boat-hours) of boat-party  $j$  interviewed during sample  $i$  within stratum  $h$ ;

$\bar{r}_h$  = mean number of hours sampled in stratum  $h$ ;  
 $= \frac{r_h}{n_h}$ ; (6)

$r_h$  = total number of hours sampled in stratum  $h$ ;  
 $= \sum_{i=1}^{n_h} r_{hi}$ ; and (7)

$r_{hi}$  = hours sampled in during sample  $i$  within stratum  $h$ .

The variance of  $\hat{E}_h$  was estimated by treating  $R_h$  in equation (1) as a constant and the rest of the equation as a ratio of random variates, and as such the

variance estimate is obtained by the standard variance formula for the product of a constant and estimate (see Kish 1965, equation 2.8.5 page 60):

$$\hat{V}[\hat{E}_h] = R_h^2 \hat{V}\left[\frac{\bar{e}_h}{\bar{r}_h}\right]; \quad (8)$$

where:

$\hat{V}\left[\frac{\bar{e}_h}{\bar{r}_h}\right]$  = estimated variance of the ratio  $\bar{e}_h/\bar{r}_h$ , obtained approximately by the usual formula for the variance of a ratio of random variables (adapted from equation 6.6 in Cochran 1977, page 154);

$$\approx \left\{ \frac{\bar{e}_h}{\bar{r}_h} \right\}^2 \left\{ \frac{s_{eh}^2}{\bar{e}_h^2} + \frac{s_{rh}^2}{\bar{r}_h^2} - \frac{2 \text{cov}(\bar{e}_h, \bar{r}_h)}{\bar{e}_h \bar{r}_h} \right\}; \quad (9)$$

$s_{eh}^2$  = variance estimate associated with estimating the effort component of the ratio of mean effort to mean hours sampled, obtained by using the usual two-stage sampling equation (modified from equation 10.8 in Cochran 1977, page 277);

$$= \left\{ (1-f_{1h}) \frac{s_{1h}^2}{n_h} \right\} + \left\{ \frac{f_{1h}}{n_h^2} \left( \sum_{i=1}^{n_h} (1-f_{2hi}) O_{hi}^2 \frac{s_{2hi}^2}{O_{hi}} \right) \right\}; \quad (10)$$

$f_{1h}$  = sampling fraction for sampling time for stratum  $h$  (this represents a modification of the usual two-stage variance equation approach, and was used to account for the differing amounts of time sampled among various samples within the same stratum);

$$= \frac{r_h}{R_h}; \quad (11)$$

$s_{1h}^2$  = the among sample variance for effort for stratum  $h$ ;

$$= \frac{\sum_{i=1}^{n_h} (\hat{e}_{hi} - \bar{e}_h)^2}{n_h - 1}; \quad (12)$$

$f_{2hi}$  = sampling fraction for boat-parties interviewed for sample  $i$  within stratum  $h$ ;

$$= \frac{O_{hi}}{O_{hi}}; \quad (13)$$

$S_{2hi}^2$  = the within sample (among boat) variance for effort for sample  $i$  within stratum  $h$ ;

$$= \frac{\sum_{j=1}^{o_{hi}} (e_{hij} - \bar{e}_{hi})^2}{o_{hi} - 1}; \quad (14)$$

$S_{rh}^2$  = variance estimate associated with the hours sampled component of the ratio of mean effort to mean hours sampled, obtained by using the usual single-stage sampling equation;

$$= (1-f_{1h}) \frac{\sum_{i=1}^{n_h} (r_{hi} - \bar{r}_h)^2}{n_h(n_h - 1)}; \text{ and} \quad (15)$$

$\text{COV}(\bar{e}_h, \bar{r}_h)$  = covariance estimate between the effort and hours sampled components of the ratio of mean effort to mean hours sampled, obtained by using the usual single-stage sampling equation;

$$= (1-f_{1h}) \frac{\sum_{i=1}^{n_h} [(\hat{e}_{hi} - \bar{e}_h)(r_{hi} - \bar{r}_h)]}{n_h(n_h - 1)}. \quad (16)$$

The approach presented above for variance estimation is valid for a stratified simple random sampling design with only two stages of sample selection (i.e., "samples" and boat-parties). Our use of this approach was not entirely correct, in that selection of time to sample within a unique combination of stratum, was not a simple random selection process. As such, the location to sample within access location types represents a third stage of sampling. Due to the complexities of the sample allocation process and due to the limitations of sampling density, we were not able to estimate the variance for this "third" stage. Additionally, the among sample variance was calculated the same for samples which occurred within the same day or between days. As such the among sample variance is an approximation of the among day, within day, and among harbor components of variance. The degree of bias due to these approximations is unknown.

Estimates of angler harvest and its variance were obtained similarly for each species of fish by replacing the angler effort statistics ( $e$ 's) in equations (1) to (16), above. Estimates of numbers of fish released were obtained similarly, as were estimates of angler-hours (as obtained by multiplying the number of hours fished by the boat-party by the number of rods fishing), and targeted angler-hours (e.g., salmon-hours).

Estimates of angler effort (in terms of boat-hours, angler-hours, and targeted angler-hours), harvest, and numbers of fish released by species across all strata or select combinations of strata were obtained by summing the corresponding stratum estimates. Variances were obtained similarly by summing the corresponding variance components (assuming independence). Standard errors were obtained by taking the square root of the variance estimates. Confidence intervals were obtained by assuming approximate normality.

Harvest per unit effort (HPUE) in terms of fish harvested per angler-hour was estimated by the following procedures for each stratum:

$$\hat{P}_h = \frac{\hat{H}_h}{\hat{E}_h}; \quad (17)$$

where:

$\hat{H}_h$  = estimated harvest for the species of interest for stratum  $h$ , obtained by equation (1), above (with the appropriate harvest statistics); and

$\hat{E}_h$  = estimated effort for stratum  $h$ , obtained by equation (1), above, using angler-hours in place of effort in boat-hours.

The variance of  $\hat{P}_h$  was obtained by the usual equation for the variance of a ratio of random variables:

$$\hat{V}[\hat{P}_h] \approx \left\{ \frac{\bar{h}_h}{\bar{e}_h} \right\}^2 \left\{ \frac{s_{hh}^2}{\bar{h}_h^2} + \frac{s_{eh}^2}{\bar{e}_h^2} - \frac{2 \text{cov}(\bar{h}_h, \bar{e}_h)}{\bar{h}_h \bar{e}_h} \right\}; \quad (18)$$

where:

$\bar{h}_h$  = overall mean harvest in stratum  $h$ , estimated by substituting the appropriate harvest statistics into equation (2), above;

$\bar{e}_h$  = overall mean angler-hours in stratum  $h$ , estimated by substituting the appropriate angler-hours effort statistics into equation (2), above;

$s_{hh}^2$  = variance estimated associated with estimating the harvest component of HPUE, obtained by substituting the appropriate harvest statistics into equations (10) to (14), above;

$s_{eh}^2$  = variance estimated associated with estimating the effort component of HPUE, obtained by substituting the appropriate angler-hours effort statistics into equations (10) to (14), above;

$\text{cov}(\bar{h}_h, \bar{e}_h)$  = covariance estimate between harvest and angler effort (in angler-hours) components of HPUE for stratum  $h$ , obtained by using the usual two-stage sampling equation;

$$= \left\{ (1 - f_{1h}) \frac{\text{cov}_{1h}(\bar{h}, \bar{e})}{n_h} \right\} + \left\{ \frac{f_{1h}}{n_h^2} \left( \sum_{i=1}^{n_h} (1 - f_{2hi}) O_{hi}^2 \frac{\text{cov}_{2hi}(\bar{h}, \bar{e})}{O_{hi}} \right) \right\}; \quad (19)$$

$\text{cov}_{1h}(\bar{h}, \bar{e})$  = the among sample covariance between angler effort (in angler-hours) and harvest for stratum  $h$ ;

$$= \frac{\sum_{i=1}^{n_h} [(\hat{h}_{hi} - \bar{h}_h)(\hat{e}_{hi} - \bar{e}_h)]}{n_h - 1}; \text{ and} \quad (20)$$

$\text{cov}_{2hi}(\bar{h}, \bar{e})$  = the within sample (among angler) covariance between angler effort (in angler-hours) and harvest for sample  $i$  within stratum  $h$ ;

$$= \frac{\sum_{j=1}^{o_{hi}} [(h_{hij} - \bar{h}_{hi})(e_{hij} - \bar{e}_{hi})]}{o_{hi} - 1}. \quad (21)$$

HPUE across all strata or select combinations of strata was estimated as follows:

$$\hat{p} = \frac{\sum_{h=1}^s \hat{H}_h}{\sum_{h=1}^s \hat{E}_h}; \quad (22)$$

where:

$s$  = the number of strata to be combined.

The variance of  $\hat{p}$  was obtained by the usual formula for the ratio of random variables:

$$\hat{V}[\hat{p}] \approx \left\{ \frac{\hat{H}}{\hat{E}} \right\}^2 \left\{ \frac{\hat{V}[\hat{H}]}{\hat{H}^2} + \frac{\hat{V}[\hat{E}]}{\hat{E}^2} - \frac{2 \text{cov}(\hat{H}, \hat{E})}{\hat{H} \hat{E}} \right\}; \quad (23)$$

where:

$$\hat{H} = \sum_{h=1}^s \hat{H}_h; \quad (24)$$

$$\hat{E} = \sum_{h=1}^s \hat{E}_h; \quad (25)$$

$$\hat{V}[\hat{H}] = \sum_{h=1}^s \hat{V}[\hat{H}_h]; \quad (26)$$

$$\hat{V}[\hat{E}] = \sum_{h=1}^s \hat{V}[\hat{E}_h]; \text{ and} \quad (27)$$

$$\text{cov}(\hat{H}, \hat{E}) = \sum_{h=1}^s \text{cov}(\bar{h}_h, \bar{e}_h). \quad (28)$$

# Count Type Creel Surveys:

The following equations were used for estimation of harvest and effort for the count-type completed-trip interview creel surveys conducted during the derby periods for the Ketchikan, Petersburg, Sitka, and Juneau marine boat fisheries:

$$\begin{aligned}\hat{E}_h &= \text{estimated boat-hours expended in stratum } h \text{ (where stratum} \\ &\quad \text{refers to each weekend of the derby, note only one weekend for} \\ &\quad \text{the Juneau derby) of each derby fishery;} \\ &= R_h \bar{X}_h; \end{aligned} \tag{29}$$

where:

$$\begin{aligned}R_h &= \text{total number of hours (available for sampling) in stratum } h; \\ \bar{X}_h &= \text{mean number of boats counted fishing over all aerial counting} \\ &\quad \text{samples in stratum } h; \end{aligned}$$

$$= \frac{\sum_{i=1}^{d_h} X_{hi}}{d_h}; \tag{30}$$

$$d_h = \text{number of samples (i.e., counts) completed in stratum } h; \text{ and}$$

$$X_{hi} = \text{number of boats counted in sample } i \text{ for stratum } h.$$

The variance of  $\hat{E}_h$  was obtained by the usual estimator for the product of a constant and a random variable (see Kish 1965, equation 2.8.5, page 60):

$$\hat{V}_h[\hat{E}_h] = R_h^2 \left( \frac{s_h^2}{d_h} \right); \tag{31}$$

where:

$$s_h^2 = \frac{\sum_{i=1}^{d_h} (X_{hi} - \bar{X}_h)^2}{d_h - 1}. \tag{32}$$

Angler catch and harvest rates along with their variances were estimated from interview data using a stratified multi-stage random estimator, according to the following equations:

$$\begin{aligned}\hat{T}_h &= \text{estimated total catch or harvest per unit effort (i.e., boat-hour) for stratum } h \text{ of each fishery;} \\ &= \frac{\sum_{j=1}^{n_h} \left( \sum_{k=1}^{o_j} C_{hjk} \right)}{\sum_{j=1}^{n_h} \left( \sum_{k=1}^{o_j} e_{hjk} \right)} ;\end{aligned}\quad (33)$$

where:

- $n_h$  = number of interview samples collected within stratum  $h$ ;
- $O_j$  = number of boat-parties interviewed within sample  $j$ ;
- $C_{hjk}$  = catch or harvest of boat-party  $k$  interviewed within sample  $j$  in stratum  $h$ ;
- $e_{hjk}$  = effort expended by boat-party  $k$  interviewed within sample  $j$  in stratum  $h$ ;

- $\hat{V}_h[\hat{T}_h]$  = estimated variance of the catch per unit effort (CPUE) or harvest per unit effort (HPUE) for stratum  $h$ , obtained by the approximation formula for the variance of the ratio of random variables (modified from equation 10.8 in Cochran 1977, page 277);

$$\approx \left\{ \frac{\bar{C}_h}{\bar{e}_h} \right\}^2 \left\{ \frac{S_{(c)h}^2}{\bar{C}_h^2} + \frac{S_{(e)h}^2}{\bar{e}_h^2} - \frac{2 \text{COV}_{(c,e)h}}{\bar{C}_h \bar{e}_h} \right\} ;\quad (34)$$

- $\bar{C}_h$  = mean of mean catch or harvest per boat-party for stratum  $h$ ;

$$= \frac{\sum_{j=1}^{n_h} \bar{C}_{hj}}{n_h} ;\quad (35)$$

- $\bar{e}_h$  = mean of mean effort per boat-party for stratum  $h$ ;

$$= \frac{\sum_{j=1}^{n_h} \bar{e}_{hj}}{n_h} ;\quad (36)$$

$\bar{c}_{hj}$  = mean catch or harvest per boat-party for sample  $j$  in stratum  $h$ ;

$$= \frac{\sum_{k=1}^{o_j} c_{hjk}}{o_j}; \quad (37)$$

$\bar{e}_{hj}$  = mean effort per boat-party for sample  $j$  in stratum  $h$ ;

$$= \frac{\sum_{k=1}^{o_j} e_{hjk}}{o_j}; \quad (38)$$

$s_{(c)h}^2$  = variance estimate associated with estimating the catch or harvest component of CPUE or HPUE in stratum  $h$ ;

$$= \left\{ \left[ 1 - \frac{n_h}{N_h} \right] \left[ \frac{s_{(c)bh}^2}{n_h} \right] \right\} + \left\{ \left[ \frac{n_h}{N_h} \right] \left[ \frac{\sum_{j=1}^{n_h} \frac{s_{(c)whj}^2}{o_j}}{n_h^2} \right] \right\}; \quad (39)$$

$N_h$  = total possible number of interview samples within stratum  $h$ ;

$s_{(c)bh}^2$  = the among sample variance component for the variance estimate of catch or harvest in stratum  $h$ ;

$$= \frac{\sum_{j=1}^{n_h} (\bar{c}_{hj} - \bar{\bar{c}}_h)^2}{n_h - 1}; \quad (40)$$

$s_{(c)whj}^2$  = the within sample variance component for the variance estimate of catch or harvest in sample  $j$  in stratum  $h$ ;

$$= \frac{\sum_{k=1}^{o_j} (c_{hjk} - \bar{c}_{hj})^2}{o_j - 1}; \quad (41)$$

$s_{(e)h}^2$  = variance estimate associated with estimating the effort component of CPUE or HPUE in stratum  $h$ , calculated by substituting the corresponding effort statistics into equations (39) - (41);

$COV_{(c,e)h}$  = covariance estimate between the catch (or harvest) and effort components of the CPUE or HPUE in stratum  $h$ ;

$$= \left\{ \left[ 1 - \frac{n_h}{N_h} \right] \left[ \frac{COV_{(c,e)bh}}{n_h} \right] \right\} + \left\{ \left[ \frac{n_h}{N_h} \right] \left[ \frac{\sum_{j=1}^{n_h} \frac{COV_{(c,e)whj}}{O_j}}{n_h^2} \right] \right\}; \quad (42)$$

$COV_{(c,e)bh}$  = the among sample covariance component between catch (or harvest) and effort in stratum  $h$ ;

$$= \frac{\sum_{j=1}^{n_h} [(\bar{c}_{hj} - \bar{c}_h)(\bar{e}_{hj} - \bar{e}_h)]}{n_h - 1}; \text{ and} \quad (43)$$

$COV_{(c,e)whj}$  = the within sample covariance component for CPUE or HPUE in sample  $j$  in stratum  $h$ ;

$$= \frac{\sum_{k=1}^{O_j} [(c_{hjk} - \bar{c}_{hj})(e_{hjk} - \bar{e}_{hj})]}{O_j - 1}. \quad (44)$$

Estimates of catch or harvest and their variances were obtained by combining the estimated stratum estimates of effort and catch (or harvest) rates, as follows:

$$\hat{C}_h = \hat{E}_h \hat{T}_h; \text{ and} \quad (45)$$

$\hat{V}_h[\hat{C}_h]$  = estimated variance of  $\hat{C}_h$  in stratum  $h$ , assuming independence of the estimates of effort and CPUE or HPUE, obtained by using the formula proposed by Goodman (1960);

$$= \hat{E}_h^2 \hat{V}_h[\hat{T}_h] + \hat{T}_h^2 \hat{V}_h[\hat{E}_h] - \hat{V}_h[\hat{E}_h] \hat{V}_h[\hat{T}_h]. \quad (46)$$

Estimates of angler effort in angler-hours were obtained similarly to the catch and harvest estimates by first estimating the angler-hour per boat-hour ratio (instead of CPUE or HPUE) by using equation (33), above with the angler-hour statistic used in place of catch (or harvest). Then equation (45) was applied using the estimated ratio (angler-hours over boat-hours) to obtain the stratum estimates of angler-hours.

Total effort, catch, or harvest across all strata (or select combinations of strata) were obtained by summing the corresponding stratum estimates. Variance estimates across strata were obtained similarly, assuming independence of the individual stratum estimates (see Kish 1965, equation 2.8.6 and 2.8.7, page 61). Standard errors were obtained by taking the square root of the variance estimates. Confidence intervals were obtained by assuming approximate normality.

Estimates of across stratum and across strata HPUE in terms of angler-hours and their variances were obtained in using the same equations as used for the direct expansion creel surveys (see equations (17) through (28)).

#### Assumptions:

The assumptions necessary for the estimates of angler effort, catch, harvest, and HPUE to be unbiased for both types of surveys (i.e., direct expansion and count) include the following:

1. anglers accurately report their hours of fishing effort and the number by species of fish released; and
2. no significant fishing effort occurred between the evening civil twilight and 0600 hours (or morning civil twilight), or at different access locations than surveyed during the direct expansion surveys, or outside of the area counted for the count type survey.

Additionally, for the direct expansion surveys the among day, within day, and among harbor components of variance (which we can not separately estimate, as noted above) were assumed to be adequately approximated by the among sample variance component (see equation (12), above). Similarly, the among sample covariance components also approximated the combination of the among day, within day, and among harbor components of covariance. This assumption is undoubtedly invalid, and hence our variance estimates are assumed to be negatively biased to an unknown degree.

#### Contributions of Coded-Wire Tagged Stocks

Adipose-clipped chinook and coho salmon sampled were measured to the nearest 5 mm (tip of snout to fork of tail) and their heads retained. A locking plastic strap with a unique number was inserted through the jaw. Heads and coded-wire tag (CWT) recovery data were sent to the ADF&G CWT Processing Laboratory in Juneau for tag removal and decoding.

Heads were classified as random (randomly sampled during regularly scheduled creel sampling periods) or select (voluntarily provided by unsampled anglers). Only random recoveries were used to estimate CWT contributions. The contribution of chinook and coho salmon with a particular tag code to the marine fisheries was estimated using procedures similar to those outlined in Clark and Bernard (1987). The methods were modified to expand recoveries of small chinook salmon harvested before 5 June. During this period, only tagged, small chinook salmon could be legally retained while untagged, small fish from the same release could not be kept. In the period before 5 June, small chinook salmon recoveries were expanded only by the fraction of chinook salmon sampled for missing adipose fins, and not by the tagged to untagged ratio. Contributions by tag code, combinations of tag codes, and their associated variances and standard errors were calculated by the procedures outlined in Suchanek and Bingham (1990, equations 21-27).

#### Chinook Salmon Age Composition and Mean Length at Age

Tip of snout to fork-of-tail lengths of chinook salmon to the nearest 5 mm, were used to estimate size composition of the marine sport harvest. Age composition of the sport chinook salmon harvest was estimated from analysis of the scales. Standard statistical procedures were followed to estimate mean length at age, age composition, and their variances.

### Pacific Halibut Size and Weight Composition

Pacific halibut total lengths were measured on most of the sampled sport harvest. Each individual length was converted to a round weight using procedures outlined in Quinn, et al. (1983). A mean round weight was calculated from these estimates, and then multiplied by the estimated harvest to estimate total round weight of the harvest.

## RESULTS

Detailed tables presenting effort and finfish harvests of the sampled marine boat fisheries can be found in Appendix C for the following fisheries: Ketchikan (Appendices C1 and C2), Petersburg (Appendices C3 and C4), Wrangell (Appendices C5 and C6), Sitka (Appendices C7 and C8), Juneau (Appendices C9 and C10), and Haines (Appendices C11 and C12). Only a summary of the most important effort and harvest results will be presented here.

### Angler Effort

The Juneau and Ketchikan boat fisheries are the largest fisheries within the region, and these were the only two fisheries monitored through September 24 (Table 1). Fisheries for salmon and halibut in the other four areas also continue into September, but effort is much smaller than in the Juneau and Ketchikan fisheries. About 76% of the 778,551 angler-hours (SE = 20,857) of effort in the sampled marine fisheries targeted on salmon. Pacific halibut were the second most important target (24%), while effort targeted on rockfish and lingcod was very minor. Effort for bottomfish in Ketchikan was 93% of that expended in Juneau, although salmon effort was only 68% of that in Juneau.

Major salmon derbies in Ketchikan, Petersburg, Sitka, and Juneau substantially increased the amount of effort targeted on salmon, as between 17% and 54% of the total fishing effort occurred during the monitored events. There was no separate estimate of derby effort in Wrangell, but it is probably within this percentage range of total effort. Derby effort was 19% of the total monitored angler effort.

### Chinook Salmon Fisheries

An estimated 20,044 chinook salmon (SE = 910) were harvested in the sampled marine fisheries (Table 2). About 64% of the chinook salmon taken in the marine boat fisheries were taken by Juneau (7,074) and Ketchikan (5,752) anglers. Ketchikan anglers released an estimated 32,560 small chinook salmon, almost 6 times the number released by Juneau anglers.

Derbies in the marine fisheries bolstered the chinook salmon harvest considerably, as about 14% of the harvest occurred during the 4 monitored derbies. The largest derby harvest of chinook salmon occurred during the Sitka Salmon Derby, where an estimated 1,073 (SE = 81) were taken. Only about 9% of the total harvest of chinook salmon was taken during the Juneau Golden North Salmon Derby, even though 18% of the total angler effort was expended during this event.

Table 1. Summary of estimated angler effort by target species for sampled marine sport fisheries of southeast Alaska during 1989.

| Total Effort     |             |                |       | Angler-Hours by Target |        |                   |       |                   |     |                    |     | Total <sup>a</sup><br>Angler-<br>Hours |        |
|------------------|-------------|----------------|-------|------------------------|--------|-------------------|-------|-------------------|-----|--------------------|-----|--|--------|
| Sport<br>Fishery | Time Period | Boat-<br>Hours | SE    | Salmon-<br>Hours       | SE     | Halibut-<br>Hours | SE    | Lingcod-<br>Hours | SE  | Rockfish-<br>Hours | SE  |  | SE     |
| Ketchikan        | 4/24 - 9/24 | 106,886        | 4,849 | 195,974                | 8,034  | 79,356            | 4,959 | 0                 | --- | 602                | 312 | 276,516                                | 11,152 |
| Petersburg       | 4/10 - 7/16 | 13,915         | 758   | 26,530                 | 1,595  | 5,536             | 810   | 0                 | --- | 0                  | --- | 32,139                                 | 1,983  |
| Wrangell         | 4/24 - 7/16 | 18,316         | 1,786 | 36,512                 | 4,344  | 7,992             | 977   | 0                 | --- | 0                  | --- | 44,504                                 | 4,473  |
| Sitka            | 4/24 - 7/02 | 17,413         | 1,199 | 34,946                 | 2,802  | 6,118             | 1,115 | 13                | 11  | 46                 | 43  | 41,362                                 | 3,091  |
| Juneau           | 4/24 - 9/24 | 145,237        | 1,961 | 287,676                | 15,173 | 85,354            | 4,404 | 0                 | --- | 0                  | --- | 373,504                                | 16,618 |
| Haines           | 4/24 - 6/25 | 4,769          | 439   | 9,363                  | 922    | 1,108             | 341   | 0                 | --- | 0                  | --- | 10,526                                 | 999    |
| TOTAL            |             | 306,536        | 8,210 | 591,001                | 18,025 | 185,464           | 6,853 | 13                | 11  | 648                | 315 | 778,551                                | 20,857 |

| Derby Effort   |                |       | Angler-Hours by Target |        |                                   |       | Total <sup>c</sup><br>Angler-<br>Hours | SE     | Percentage of<br>Total Fishery <sup>d</sup> |
|--|----------------|-------|------------------------|--------|-----------------------------------|-------|--|--------|---|
| Major Salmon Derby<br>(Derby Dates)                        | Boat-<br>Hours | SE    | Salmon-<br>Hours       | SE     | Bottomfish-<br>Hours <sup>b</sup> | SE    |  |        |   |
| Ketchikan King Salmon Derby<br>(5/27-29, 6/03-04, 6/10-11) | 19,270         | 2,019 | 42,387                 | 1,445  | 5,332                             | 860   | 47,718                                 | 1,422  | 17%   |
| Petersburg King Salmon Derby<br>(5/26-5/29)                | 4,704          | 348   | 10,573                 | 839    | 134                               | 85    | 10,716                                 | 861    | 33%   |
| Sitka Salmon Derby<br>(5/27-29, 6/03-04)                   | 9,117          | 918   | 21,675                 | 2,448  | 735                               | 555   | 22,410                                 | 2,346  | 54%   |
| Juneau Golden North Salmon Derby<br>(8/04-06)              | 23,347         | 4,572 | 64,413                 | 12,705 | 1,730                             | 811   | 66,143                                 | 12,994 | 18%   |
| TOTAL  | 56,438         | 5,094 | 139,048                | 13,047 | 7,931                             | 1,309 | 146,987                                | 13,308 | 19%   |

<sup>a</sup> Includes all targeted and non-targeted effort, including derby effort.

<sup>b</sup> Includes halibut-hours, lingcod-hours, and rockfish-hours combined.

<sup>c</sup> Includes all targeted and non-targeted effort for derby only.

<sup>d</sup> For angler-hours only.

Table 2. Summary of estimated catches and harvests of chinook salmon in sampled marine sport fisheries of southeast Alaska during 1989.

| <u>Total Chinook Salmon Catches</u> |             | Chinook >28" |          | Chinook <28" |          | Total Chinook Harvested |     |
|-------------------------------------|-------------|--------------|----------|--------------|----------|-------------------------|-----|
| Sport Fishery                       | Time Period | Kept         | Released | Kept         | Released | Number                  | SE  |
| Ketchikan                           | 4/24 - 9/24 | 5,495        | 115      | 257          | 32,560   | 5,752                   | 497 |
| Petersburg                          | 4/10 - 7/16 | 1,403        | 39       | 11           | 534      | 1,414                   | 150 |
| Wrangell                            | 4/24 - 7/16 | 2,051        | 52       | 0            | 238      | 2,051                   | 372 |
| Sitka                               | 4/24 - 7/02 | 3,501        | 39       | 0            | 1,416    | 3,501                   | 428 |
| Juneau                              | 4/24 - 9/24 | 6,902        | 134      | 172          | 5,557    | 7,074                   | 484 |
| Haines                              | 4/24 - 6/25 | 235          | 2        | 17           | 420      | 252                     | 45  |
| TOTAL                               |             | 19,587       | 381      | 457          | 40,725   | 20,044                  | 910 |

| <u>Derby Chinook Salmon Harvests</u>                    |  | Chinook >28" |                    | Chinook <28" |                    | Total Chinook Harvested |                  | Percent of Fishery <sup>2</sup> |
|---|--|--------------|--------------------|--------------|--------------------|-------------------------|------------------|---------------------------------|
| Major Salmon Derby (Derby Dates)                        |  | Entered      | Total <sup>a</sup> | Entered      | Total <sup>a</sup> | Number                  | SE               |                                 |
| Ketchikan King Salmon Derby (5/27-29, 6/03-04, 6/10-11) |  | 346          | 820                | 0            | 0                  | 820                     | 81               | 14%                             |
| Petersburg King Salmon Derby (5/26-5/29)                |  | 295          | 295                | 1            | 1                  | 296                     | N/A <sup>c</sup> | 21%                             |
| Sitka Salmon Derby (5/27-29, 6/03-04)                   |  | 670          | 1,073              | 0            | 0                  | 1,073                   | 81               | 31%                             |
| Juneau Golden North Salmon Derby (8/04-06)              |  | 412          | 609                | 0            | 0                  | 609                     | 205              | 9%                              |
| TOTAL   |  | 1,723        | 2,797              | 1            | 1                  | 2,798                   | 235              | 14%                             |

<sup>a</sup> Includes entered and take-home harvests.

<sup>b</sup> For total chinook salmon harvested only.

<sup>c</sup> Not available.

The portion of the total harvest of large chinook salmon sampled for adipose clips varied from fishery to fishery, but the overall sampling fraction totaled 19% (Appendix C13). An estimated 30% of the total (large and small) chinook salmon harvest was of hatchery origin, although this varied greatly from fishery to fishery (Table 3). Fisheries with the highest percentages of hatchery fish were Ketchikan (52%), Sitka (34%) and Petersburg (32%). Hatchery fish taken in Haines totaled an estimated 8 chinook salmon reared at Crystal Lake hatchery and released in the Tahini River. Average Alaska hatchery contribution for all marine fisheries combined was 19%.

Largest of the Alaskan hatchery contributors, to the harvest of chinook salmon, included the Neets Bay and Whitman Lake hatcheries owned by Southern Southeast Regional Aquaculture Association and the Crystal Lake and Snettisham hatcheries owned by Alaska Department of Fish and Game. Detailed contribution estimates by tag code and time period are presented in Appendix C for Ketchikan (Appendix C14), Petersburg (Appendix C15), Wrangell (Appendix C16), Sitka (Appendix C17), Juneau (Appendix C18), and Haines (Appendix C19). In addition to the recoveries of hatchery origin fish, a wild adipose-clipped chinook salmon was recovered during the Sitka Salmon Derby (Appendix C17).

Harvests of small chinook salmon in terminal areas near hatchery release sites opened by emergency regulation totaled an estimated 149 (SE = 53) (Table 4). An additional 439 small chinook salmon (SE = 157) were released; thus only 25% of the small chinook salmon caught in these terminal harvest areas were retained. All of the four small chinook salmon evaluated for maturity from the Juneau terminal harvest area were immature. Maturity of chinook salmon within the other terminal area fisheries was not evaluated.

The age composition of the chinook salmon harvest varied considerably among the surveyed fisheries (Table 5 and Appendix C20). About 66% of the chinook salmon sampled in Sitka lacked a freshwater annulus (Age 0.\_), which usually indicates non-Alaskan origin (Van Alen 1988). About 38% of the Juneau Golden North Salmon Derby harvest was comprised of Age 0.\_ chinook salmon while only 2% of the Haines harvest was of Age 0.\_ fish. In the spring fisheries in Petersburg, Sitka, and Wrangell, 51% to 70% of the chinook salmon harvest was composed of fish which had spent at least 4 years in saltwater (Age \_.4 or more). In the Juneau and Ketchikan fisheries, 81% to 97% of the chinook salmon sampled were Age \_.3 or less. Mean length at age of sampled chinook salmon for a given age class varied somewhat among the fisheries surveyed (Appendix C21).

### Coho Salmon Fisheries

Harvests of coho salmon in the monitored marine fisheries totaled an estimated 34,705 fish (SE = 1,625) (Table 6). Only small percentages of the coho salmon fisheries in Petersburg, Wrangell, Sitka, and Haines were monitored, as surveys of the other fisheries were all discontinued by July 17. The only monitored derby in which coho salmon are heavily targeted is the Juneau Golden North Salmon Derby, and an estimated 3,173 coho salmon (SE = 233) were taken during this event.

Harvest rates of coho salmon for the Ketchikan and Juneau fisheries ranged up to a maximum of 0.204 coho salmon per angler-hour of effort (Table 7). The harvest rates for coho salmon peaked in the period from 14 to 27 August in Juneau and in the period from 11 September to 24 September in Ketchikan. Juneau anglers

Table 3. Contributions of hatchery chinook salmon to the major marine sport fisheries of southeast Alaska, 1989.

| Region or Hatchery                  | Marine Boat Sport Fishery |            |          |       |        |        | Total <sup>a</sup> |
|-------------------------------------|---------------------------|------------|----------|-------|--------|--------|--------------------|
|                                     | Ketchikan                 | Petersburg | Wrangell | Sitka | Juneau | Haines |                    |
| Oregon                              | 22                        | 0          | 10       | 0     | 10     | 0      | 42                 |
| Washington                          | 0                         | 0          | 0        | 117   | 5      | 0      | 122                |
| British Columbia                    | 888                       | 36         | 12       | 853   | 138    | 0      | 1,927              |
| Non-Alaskan Total                   | 910                       | 36         | 22       | 970   | 153    | 0      | 2,091              |
| (SE)                                | (373)                     | (33)       | (16)     | (522) | (94)   | (0)    | (650)              |
| Alaska                              |                           |            |          |       |        |        |                    |
| Crystal Lake (ADFG <sup>b</sup> )   | 5                         | 377        | 0        | 3     | 198    | 8      | 591                |
| Deer Mountain (ADFG)                | 139                       | 0          | 0        | 0     | 31     | 0      | 170                |
| Hidden Falls (ADFG)                 | 0                         | 0          | 0        | 0     | 31     | 0      | 31                 |
| Snettisham (ADFG)                   | 0                         | 1          | 0        | 0     | 306    | 0      | 307                |
| Tamgas Creek (MIC <sup>c</sup> )    | 223                       | 0          | 0        | 0     | 0      | 0      | 223                |
| L. Port Walter (NMFS <sup>d</sup> ) | 1                         | 17         | 0        | 30    | 71     | 0      | 119                |
| Medvejie (NSRA <sup>e</sup> )       | 0                         | 0          | 0        | 179   | 0      | 0      | 179                |
| Neets Bay (SSRA <sup>f</sup> )      | 989                       | 0          | 236      | 0     | 91     | 0      | 1,316              |
| Carroll Inlet (SSRA)                | 275                       | 0          | 0        | 0     | 112    | 0      | 387                |
| Whitman Lake (SSRA)                 | 450                       | 25         | 0        | 3     | 25     | 0      | 503                |
| Alaskan Total                       | 2,082                     | 420        | 236      | 215   | 865    | 8      | 3,826              |
| (SE)                                | (494)                     | (127)      | (239)    | (179) | (161)  | (6)    | (613)              |
| All Areas Grand Total               | 2,992                     | 456        | 258      | 1,185 | 1,018  | 8      | 5,917              |
| (SE)                                | (619)                     | (132)      | (240)    | (552) | (187)  | (6)    | (894)              |
| Chinook Salmon Harvest              | 5,752                     | 1,414      | 2,051    | 3,501 | 7,074  | 252    | 20,044             |
| (SE)                                | (498)                     | (150)      | (372)    | (428) | (485)  | (45)   | (911)              |
| Percent Hatchery                    | 52%                       | 32%        | 13%      | 34%   | 14%    | 3%     | 30%                |

<sup>a</sup> Includes both large and small chinook salmon

<sup>b</sup> Alaska Department of Fish and Game

<sup>c</sup> Metlakatla Indian Community

<sup>d</sup> National Marine Fisheries Service

<sup>e</sup> Northern Southeast Regional Aquaculture Association

<sup>f</sup> Southern Southeast Regional Aquaculture Association

Table 4. Summary of estimated effort and catches and harvests of chinook salmon in terminal harvest areas near Juneau, Ketchikan, and Petersburg opened by regulatory action to the harvest of small chinook salmon.

| Terminal Area<br>Sport Fishery | Effort (Salmon-Hours) |     | Small Chinook (<28") |    |          |     | Large Chinook (>28") |    |
|--------------------------------|-----------------------|-----|----------------------|----|----------|-----|----------------------|----|
|                                |                       |     | Kept                 |    | Released |     | Kept                 |    |
|                                | Estimate              | SE  | Estimate             | SE | Estimate | SE  | Estimate             | SE |
| Juneau                         | 597                   | 269 | 52                   | 31 | 32       | 22  | 49                   | 32 |
| Ketchikan                      | 2,934                 | 890 | 87                   | 43 | 402      | 155 | 135                  | 59 |
| Petersburg                     | 1,112                 | 224 | 10                   | 7  | 5        | 4   | 174                  | 60 |
| TOTAL                          | 4,643                 | 957 | 149                  | 53 | 439      | 157 | 358                  | 90 |

Table 5. Summary of the age composition of chinook salmon sampled in selected marine sport fisheries of southeast Alaska during 1989.

Freshwater Age Composition

| Sport<br>Fishery          | Age 0._        |         | Age 1._        |         | Total<br>Sampled |
|---------------------------|----------------|---------|----------------|---------|------------------|
|                           | Sample<br>Size | Percent | Sample<br>Size | Percent |                  |
| Ketchikan                 | 110            | 22%     | 390            | 78%     | 500              |
| Petersburg                | 51             | 24%     | 164            | 76%     | 215              |
| Wrangell                  | 24             | 18%     | 110            | 82%     | 134              |
| Sitka                     | 164            | 66%     | 83             | 34%     | 247              |
| Juneau Non-Derby          | 88             | 22%     | 320            | 78%     | 408              |
| Juneau Derby <sup>a</sup> | 69             | 38%     | 115            | 63%     | 184              |
| Haines                    | 1              | 2%      | 43             | 98%     | 44               |
| Total                     | 507            | 29%     | 1,225          | 71%     | 1,732            |

Saltwater Age Composition

| Sport<br>Fishery          | Age _.3 or less |         | Age _.4 or more |         | Total<br>Sampled |
|---------------------------|-----------------|---------|-----------------|---------|------------------|
|                           | Sample<br>Size  | Percent | Sample<br>Size  | Percent |                  |
| Ketchikan                 | 405             | 81%     | 95              | 19%     | 500              |
| Petersburg                | 105             | 49%     | 110             | 51%     | 215              |
| Wrangell                  | 48              | 36%     | 86              | 64%     | 134              |
| Sitka                     | 73              | 30%     | 174             | 70%     | 247              |
| Juneau Non-Derby          | 352             | 86%     | 56              | 14%     | 408              |
| Juneau Derby <sup>a</sup> | 179             | 97%     | 5               | 3%      | 184              |
| Haines                    | 25              | 57%     | 19              | 43%     | 44               |
| Total                     | 1,187           | 69%     | 545             | 31%     | 1,732            |

<sup>a</sup> Juneau Golden North Salmon Derby

Table 6. Summary of estimated harvests and catches of coho salmon in sampled marine sport fisheries of southeast Alaska during 1989.

|  |             | Coho Salmon Harvest |          |     |                    |       |                         |     |
|--|-------------|---------------------|----------|-----|--------------------|-------|-------------------------|-----|
| Sport<br>Fishery                       | Time Period | Wild                | Hatchery |     | Total              |       | Coho Salmon<br>Released |     |
|  |             |                     | Number   | SE  | Number             | SE    | Number                  | SE  |
| Ketchikan                              | 4/24 - 9/24 | 9,634               | 1,147    | 458 | 10,781             | 870   | 1,707                   | 407 |
| Petersburg                             | 4/10 - 7/16 | 1                   | 0        | --- | 1                  | ---   | 0                       | --- |
| Wrangell                               | 4/24 - 7/16 | 0                   | 0        | --- | 0                  | ---   | 8                       | 7   |
| Sitka                                  | 4/24 - 7/02 | 104                 | 0        | --- | 104                | 67    | 88                      | 48  |
| Juneau Non-Derby<br>Derby <sup>a</sup> | 4/24 - 9/24 | 19,828              | 818      | 162 | 20,646             | 1,351 | 651                     | 127 |
|  | 8/04 - 8/06 | 3,061               | 112      | 62  | 3,173 <sup>b</sup> | 233   | 42                      | 18  |
|  | Subtotal    | 22,889              | 930      | 173 | 23,819             | 1,371 | 693                     | 129 |
| Haines                                 | 4/24 - 6/25 | 0                   | 0        | --- | 0                  | ---   | 0                       | --- |
| TOTAL                                  |             | 32,628              | 2,077    | 490 | 34,705             | 1,625 | 2,496                   | 430 |

<sup>a</sup> Juneau Golden North Salmon Derby

<sup>b</sup> Of the 3,173 coho salmon harvested, 2,166 were entered in the derby.

Table 7. Harvest rates for coho salmon (harvest per angler-hour of effort) by seasonal period in the Ketchikan and Juneau marine boat fisheries during 1989.

| Seasonal<br>Period | Harvest of Coho Salmon per<br>Angler-Hour of Effort <sup>a</sup> |       |        |        |
|--------------------|--|-------|--------|--------|
|                    | Ketchikan  |       | Juneau |        |
|                    | HPUE   | SE    | HPUE   | SE     |
| 5/22-6/04          | 0.000  | 0.000 | 0.000  | 0.000  |
| 6/05-6/18          | 0.002  | 0.001 | <0.001 | <0.001 |
| 6/19-7/02          | 0.015  | 0.006 | 0.003  | 0.001  |
| 7/03-7/16          | 0.037  | 0.013 | 0.018  | 0.003  |
| 7/17-7/30          | 0.060  | 0.018 | 0.058  | 0.007  |
| 7/31-8/13          | 0.069  | 0.014 | 0.118  | 0.022  |
| 8/14-8/27          | 0.070  | 0.012 | 0.204  | 0.033  |
| 8/28-9/10          | 0.082  | 0.022 | 0.132  | 0.022  |
| 9/11-9/24          | 0.103  | 0.031 | 0.113  | 0.030  |
| All Periods        | 0.047  | 0.004 | 0.067  | 0.005  |

<sup>a</sup> Does not include derby effort or harvest.

experienced higher harvest rates for coho salmon than did Ketchikan anglers from 31 July through 24 September.

An estimated 19% of the coho salmon harvest of the monitored fisheries was checked for adipose clips (Appendix C22). Estimates of coho salmon hatchery contributions by tag code and time period are presented in Appendix C for the Ketchikan (Appendix C23) and Juneau (Appendix C24) fisheries. Only 4% of the harvest of coho salmon in the Juneau fishery was of hatchery origin while 11% of the Ketchikan harvest was of hatchery origin (Table 8). There were no hatchery coho salmon recovered in the other sport fisheries. All of the hatchery coho salmon were produced by southeast Alaska hatcheries. The Neets Bay hatchery contributed the most coho salmon to the Ketchikan fishery while the Snettisham hatchery contributed the most coho salmon to the Juneau fishery. Additionally, some recoveries of coho salmon from wild stocks were obtained in the Juneau and Ketchikan fisheries (Appendix C25). As tagging fractions were unknown, total contributions of these wild-tagged stocks could not be estimated.

### Bottomfish Fisheries

Most of the bottomfish effort in southeast Alaska is targeted on Pacific halibut, and an estimated 28,256 (SE = 1,412) were taken in the sampled marine fisheries (Table 9). A relatively large amount of Pacific halibut harvest in addition to that listed takes place in the Sitka, Wrangell, Petersburg, and Haines fisheries after surveys ended. Estimated average round weight of the Pacific halibut harvested by community varied between 20 and 27 pounds, except in Ketchikan where the average Pacific halibut weight was estimated to be 34 pounds (Table 10). Almost 0.8 million pounds of halibut were taken during the monitored fisheries.

Although rockfish are not a primary target of most marine anglers, large numbers of rockfish were caught in the Ketchikan and Sitka marine fisheries (Table 9). Most of the rockfish harvest (83%) occurred in the Ketchikan fishery, as anglers in the Sitka fishery released 87% of the rockfish caught and retained only 683. This high release rate for Sitka anglers was not due to reduced bag limits for rockfish, as very few anglers retained substantial numbers of rockfish. Release rates in the Ketchikan fishery were also substantial, as anglers released 6,742 rockfish in addition to those harvested. Juneau anglers retained 97% (1,375) of the 1,411 rockfish caught.

Species composition of the rockfish harvest was determined for the Ketchikan and Sitka fisheries (Table 11). Yelloweye rockfish were most frequently taken in the Ketchikan fishery comprising 43% (4,812) of the harvest. Quillback rockfish were the second most frequently found rockfish (29%) in the harvest of the Ketchikan fishery and were most abundant in the Sitka harvest (35%). In addition to the two species mentioned, sport harvests also included substantial numbers of silvergrey and black rockfish. Other minor species in the sport harvest included dusky rockfish, copper rockfish, yellowtail rockfish, and bocaccio along with a variety of other unidentified species. Lingcod were also harvested primarily in the Sitka and Ketchikan fisheries (Table 9).

### Other Salmonid Fisheries

Although not usually primary targets, other salmonids such as pink, chum, and sockeye salmon, and Dolly Varden were harvested in the monitored fisheries

Table 8. Contributions of hatchery coho salmon to the Ketchikan and Juneau marine sport fisheries of southeast Alaska, 1989.

| Hatchery                          | Sport Fishery |     |        |       | Total  | SE    |
|-----------------------------------|---------------|-----|--------|-------|--------|-------|
|                                   | Ketchikan     | SE  | Juneau | SE    |        |       |
| Crystal Lake (ADFG <sup>a</sup> ) | 0             | --- | 38     | 37    | 38     | 37    |
| Deer Mountain (ADFG)              | 207           | 52  | 0      | ---   | 207    | 52    |
| Klawock (ADFG)                    | 176           | 176 | 0      | ---   | 176    | 176   |
| Snettisham (ADFG)                 | 0             | --- | 605    | 162   | 605    | 162   |
| Sheep Creek (DIPC <sup>b</sup> )  | 0             | --- | 287    | 51    | 287    | 51    |
| Neets Bay (SSRAA <sup>c</sup> )   | 691           | 418 | 0      | ---   | 691    | 418   |
| Whitman Lake (SSRAA)              | 73            | 43  | 0      | ---   | 73     | 43    |
| Total                             | 1,147         | 458 | 930    | 173   | 2,077  | 490   |
| Coho Salmon Harvest               | 10,781        | 870 | 23,819 | 1,371 | 34,600 | 1,624 |
| Percent Hatchery                  | 11%           |     | 4%     |       | 6%     |       |

<sup>a</sup> Alaska Department of Fish and Game

<sup>b</sup> Douglas Island Pink and Chum

<sup>c</sup> Southern Southeast Regional Aquaculture Association

Table 9. Summary of estimated harvests of Pacific halibut, rockfish, and lingcod in sampled marine sport fisheries of southeast Alaska during 1989.

| Sport Fishery | Time Period | Pacific Halibut |       |          |     | Rockfish |     |          |     | Lingcod |     |          |     |
|---------------|-------------|-----------------|-------|----------|-----|----------|-----|----------|-----|---------|-----|----------|-----|
|               |             | Kept            | SE    | Released | SE  | Kept     | SE  | Released | SE  | Kept    | SE  | Released | SE  |
| Ketchikan     | 4/24 - 9/24 | 10,797          | 948   | 1,256    | 275 | 11,224   | 906 | 6,742    | 681 | 1,711   | 236 | 233      | 88  |
| Petersburg    | 4/10 - 7/16 | 1,271           | 221   | 1,252    | 309 | 53       | 31  | 0        | --- | 0       | --- | 0        | --- |
| Wrangell      | 4/24 - 7/16 | 894             | 146   | 12       | 8   | 153      | 54  | 39       | 30  | 41      | 21  | 4        | 3   |
| Sitka         | 4/24 - 7/02 | 2,694           | 567   | 1,411    | 367 | 683      | 182 | 4,459    | 551 | 294     | 87  | 706      | 261 |
| Juneau        | 4/24 - 9/24 | 12,484          | 835   | 2,406    | 347 | 1,375    | 145 | 36       | 19  | 17      | 14  | 0        | --- |
| Haines        | 4/24 - 6/25 | 116             | 72    | 8        | 7   | 0        | --- | 80       | 74  | 0       | --- | 0        | --- |
| TOTAL         |             | 28,256          | 1,412 | 6,345    | 653 | 13,488   | 938 | 11,356   | 880 | 2,063   | 253 | 943      | 275 |

Table 10. Average lengths, round weights, and total round weight for Pacific halibut harvested by selected marine sport fisheries of southeast Alaska during 1989.

| Sport Fishery | Time Period | Sample Size | Total Length |         | Average Round Wt. (lbs) | Estimated Number Harvested | Estimated Total Round Weight (thousand lbs) |
|---------------|-------------|-------------|--------------|---------|-------------------------|----------------------------|---|
|               |             |             | Mean (cm)    | SE (cm) |                         |                            |   |
| Ketchikan     | 4/24 - 9/24 | 611         | 97.9         | 1.1     | 34.0                    | 10,797                     | 367.1                                       |
| Petersburg    | 4/10 - 7/16 | 37          | 88.1         | 3.5     | 22.4                    | 1,271                      | 28.5  |
| Wrangell      | 4/24 - 7/16 | 108         | 88.1         | 2.3     | 23.5                    | 894                        | 21.0  |
| Sitka         | 4/24 - 7/02 | 43          | 92.9         | 3.4     | 26.8                    | 2,694                      | 72.2  |
| Juneau        | 4/24 - 9/24 | 662         | 87.4         | 1.0     | 24.1                    | 12,484                     | 300.9                                       |
| Haines        | 4/24 - 6/25 | 13          | 87.2         | 5.3     | 20.7                    | 116                        | 2.4   |
| TOTAL         |             | 1,474       | 92.0         |         | 28.2                    | 28,256                     | 792.1                                       |

Table 11. Rockfish species composition in the Ketchikan and Sitka marine sport fisheries during 1989. Due to time constraints, approximately 22% of the rockfish harvest in the Ketchikan area was not keyed out to species. The unidentified rockfish harvest was allocated to species by expanding the appropriate percentage of harvest in the identified harvest to the total harvest.

| Species             | Ketchikan |         | Sitka   |         | Total <sup>a</sup> |         |
|---------------------|-----------|---------|---------|---------|--------------------|---------|
|                     | Harvest   | Percent | Harvest | Percent | Harvest            | Percent |
| Black Rockfish      | 467       | 4%      | 108     | 16%     | 575                | 5%      |
| Boccacio            | --        | --      | 18      | 3%      | 18                 | <1%     |
| Copper Rockfish     | 30        | <1%     | 31      | 5%      | 61                 | <1%     |
| Dusky Rockfish      | 21        | <1%     | 89      | 13%     | 110                | 1%      |
| Quillback Rockfish  | 3,237     | 29%     | 161     | 24%     | 3,398              | 29%     |
| Silvergrey Rockfish | 1,867     | 17%     | --      | --      | 1,867              | 16%     |
| Yelloweye Rockfish  | 4,812     | 43%     | 35      | 5%      | 4,847              | 41%     |
| Yellowtail Rockfish | 6         | <1%     | 0       | 0%      | 6                  | <1%     |
| Other Rockfish      | 784       | 7%      | 241     | 35%     | 1,025              | 9%      |
| TOTAL               | 11,224    | 100%    | 683     | 101%    | 11,907             | 101%    |

<sup>a</sup> The boccacio harvest in Ketchikan and the silvergrey rockfish harvest in Sitka were not estimated and were therefore assumed to be 0 in these communities for purposes of computing totals.

(Table 12). Most of the harvest of the incidental salmon species in the Petersburg, Wrangell, Sitka, and Haines fisheries occurs after these surveys were terminated. Pink salmon are sometimes targeted by marine boat anglers, and an estimated 31,295 (SE = 3,885) were taken in the monitored fisheries with the majority taken in Ketchikan (73%). Retention rates for pink salmon were high (89%), as were retention rates for other incidentally harvested salmonids. Harvests of Dolly Varden were generally highest in the northern fisheries of Sitka, Juneau, and Haines.

### Shellfish Fisheries

Effort and harvests of Dungeness, Tanner, and king crab were estimated for all of the marine fisheries sampled (Table 13). The highest effort in boat-days for shellfish was documented in the Juneau fishery (2,652 boat-days). Since some effort was expended by divers, effort in boat-days is more comparable from fishery to fishery than effort in number of pots or rings fished. Dungeness crab were harvested in the highest numbers by all fisheries, but Tanner and king crabs were also harvested in relatively large numbers in Juneau. The red and blue king crab fishery is closed from 1 April through 30 June.

## DISCUSSION

On-site creel surveys of the Juneau marine boat sport fishery have been conducted every year since 1960 (Mattson 1975; Schmidt, et al. 1973; Schmidt and Robards 1974, 1975; Robards 1976, 1977, 1978; Marriott, et al. 1979; Schwan 1980, 1981, 1982; Neimark and Schwan 1983; Neimark 1984, 1985; Mecum and Suchanek 1986, 1987; Bingham, et al. 1988; and Suchanek and Bingham 1989). Other major Southeast marine fisheries have been sampled much more sporadically, and it has only been since 1983 that the marine sampling program has been expanded to consistently monitor areas other than the Juneau fishery.

Among year comparisons of angler effort and harvest for a given fishery are somewhat confounded by some variation in the time periods surveyed from year to year. Effort and harvest at either the beginning or the end of the survey season is small, however, in comparison to effort during the middle of the season. Among year comparisons are generally valid, but the variations in survey periods should be noted. Since only the Ketchikan and Juneau surveys are run into late September, only small percentages of harvests of pink and coho salmon and Pacific halibut for the other fisheries are monitored.

### Angler Effort

The Juneau and Ketchikan marine boat fisheries have been consistently surveyed from approximately mid- to late April through the end of September (Table 14). Total effort in the Juneau fishery during 1989 was about 9% higher than the 1983-1988 average of 342,000 angler-hours. Average effort through 1988 (as determined from available data) for the Ketchikan fishery was 219,126 angler-hours, or about 64% of the Juneau effort. With 1989 effort in Ketchikan totaling 26% above the average for the 1984-1988 period, it appears that this fishery expanded substantially in 1989. The percentage of effort expended for salmon in the Juneau and Ketchikan fisheries during 1989 was 77% and 71%,

Table 12. Summary of estimated harvests of pink salmon, chum salmon, sockeye salmon, and Dolly Varden in sampled marine sport fisheries of southeast Alaska during 1989.

| Sport<br>Fishery | Time Period | Pink Salmon |          | Chum Salmon |          | Sockeye Salmon |          | Dolly Varden |          |
|------------------|-------------|-------------|----------|-------------|----------|----------------|----------|--------------|----------|
|                  |             | Kept        | Released | Kept        | Released | Kept           | Released | Kept         | Released |
| Ketchikan        | 4/24 - 9/24 | 22,813      | 2,267    | 540         | 45       | 75             | 0        | 0            | 483      |
| Petersburg       | 4/10 - 7/16 | 6           | 0        | 0           | 0        | 4              | 0        | 219          | 23       |
| Wrangell         | 4/24 - 7/16 | 48          | 0        | 0           | 0        | 0              | 0        | 0            | 0        |
| Sitka            | 4/24 - 7/02 | 14          | 24       | 0           | 0        | 11             | 0        | 208          | 253      |
| Juneau           | 4/24 - 9/24 | 8,414       | 1,594    | 481         | 54       | 192            | 0        | 1,367        | 238      |
| Haines           | 4/24 - 6/25 | 0           | 0        | 0           | 0        | 0              | 0        | 65           | 38       |
| Total            |             | 31,295      | 3,885    | 1,021       | 99       | 282            | 0        | 1,859        | 1,035    |

Table 13. Estimated effort for, and harvests of, Dungeness, king, and tanner crab and shrimp in major boat personal use, sport, and subsistence fisheries of southeast Alaska during 1989.

|                               | APPROXIMATE<br>95% C.I. LOWER<br>LIMIT | ESTIMATE | APPROXIMATE<br>95% C.I. UPPER<br>LIMIT |
|-------------------------------|--|----------|--|
| <u>Ketchikan (4/24-9/24)</u>  |  |          |  |
| Boat-days Fished              | 312                                    | 508      | 705                                    |
| Dungeness Crab Kept           | 1,226                                  | 2,688    | 4,150                                  |
| King Crab Kept                | 0                                      | 0        | 0                                      |
| Tanner Crab Kept              | 17                                     | 100      | 229                                    |
| Shrimp Kept                   | 2,250                                  | 12,730   | 23,200                                 |
| <u>Petersburg (4/10-7/16)</u> |  |          |  |
| Boat-days Fished              | 57                                     | 103      | 150                                    |
| Dungeness Crab Kept           | 168                                    | 501      | 835                                    |
| King Crab Kept                | 0                                      | 0        | 0                                      |
| Tanner Crab Kept              | 6                                      | 31       | 86                                     |
| Shrimp Kept                   | ---                                    | ---      | ---                                    |
| <u>Wrangell (4/24-7/16)</u>   |  |          |  |
| Boat-days Fished              | 111                                    | 207      | 303                                    |
| Dungeness Crab Kept           | 348                                    | 887      | 1,427                                  |
| King Crab Kept                | 0                                      | 0        | 0                                      |
| Tanner Crab Kept              | 0                                      | 0        | 0                                      |
| Shrimp Kept                   | ---                                    | ---      | ---                                    |
| <u>Sitka (4/24-7/02)</u>      |  |          |  |
| Boat-days Fished              | 23                                     | 76       | 129                                    |
| Dungeness Crab Kept           | 37                                     | 241      | 445                                    |
| King Crab Kept                | 0                                      | 0        | 0                                      |
| Tanner Crab Kept              | 0                                      | 0        | 0                                      |
| Shrimp Kept                   | ---                                    | ---      | ---                                    |
| <u>Juneau (4/24-9/24)</u>     |  |          |  |
| Boat-days Fished              | 2,232                                  | 2,652    | 3,071                                  |
| Dungeness Crab Kept           | 5,892                                  | 8,356    | 10,820                                 |
| King Crab Kept                | 1,231                                  | 1,849    | 2,466                                  |
| Tanner Crab Kept              | 1,863                                  | 3,369    | 4,874                                  |
| Shrimp Kept                   | ---                                    | ---      | ---                                    |
| <u>Haines (4/24-6/25)</u>     |  |          |  |
| Boat-days Fished              | 1                                      | 16       | 48                                     |
| Dungeness Crab Kept           | 14                                     | 223      | 670                                    |
| King Crab Kept                | 0                                      | 0        | 0                                      |
| Tanner Crab Kept              | 0                                      | 0        | 0                                      |
| Shrimp Kept                   | ---                                    | ---      | ---                                    |

Table 14. Estimated angler effort in the Juneau and Ketchikan marine sport fisheries as determined by on-site creel surveys for comparable sample periods.

| Sport Fishery | Year | Survey Dates                   | Salmon-Hours |         | Bottomfish-Hours |         | Total Angler-hours |
|---------------|------|--------------------------------|--------------|---------|------------------|---------|--------------------|
|               |      |                                | Estimate     | Percent | Estimate         | Percent |                    |
| Juneau        | 1983 | 4/17-10/01                     | 236,344      | 74%     | 84,259           | 26%     | 320,603            |
|               | 1984 | 4/29-9/29                      | 246,732      | 77%     | 72,090           | 23%     | 318,822            |
|               | 1985 | 4/15-9/29                      | 269,077      | 79%     | 72,381           | 21%     | 341,458            |
|               | 1986 | 4/14-10/05                     | 240,921      | 76%     | 77,165           | 24%     | 318,086            |
|               | 1987 | 3/16-9/27                      | 307,124      | 76%     | 94,658           | 24%     | 401,840            |
|               | 1988 | 4/11-9/25                      | 254,196      | 72%     | 96,188           | 27%     | 351,247            |
|               |      | Average                        | 259,066      | 76%     | 82,790           | 24%     | 342,009            |
|               | 1989 | 4/24-9/24                      | 287,676      | 77%     | 85,354           | 23%     | 373,504            |
|               |      | % of Average                   | 111%         |         | 103%             |         | 109%               |
|               |      |                                |              |         |                  |         |                    |
| Ketchikan     | 1984 | 4/29-9/29                      | 161,100      | 72%     | 62,625           | 28%     | 223,725            |
|               | 1985 | -----No comparable survey----- |              |         |                  |         |                    |
|               | 1986 | 4/28-9/28                      | 133,518      | 72%     | 51,208           | 28%     | 184,726            |
|               | 1987 | 4/20-9/27                      | 157,306      | 65%     | 84,954           | 35%     | 242,274            |
|               | 1988 | 4/11-9/25                      | 153,086      | 68%     | 71,611           | 32%     | 225,779            |
|               |      | Average                        | 151,253      | 69%     | 67,600           | 31%     | 219,126            |
|               | 1989 | 4/24-9/24                      | 195,974      | 71%     | 79,958           | 29%     | 276,516            |
|               |      | % of Average                   | 130%         |         | 118%             |         | 126%               |

respectively. These percentages are very similar to averages over the past few years for both fisheries.

Fisheries in Petersburg, Wrangell, Sitka, and Haines have been consistently surveyed only during the spring from approximately mid-April until late June or mid-July (Table 15). With the exception of Haines, angler effort in these fisheries during 1989 was well above average. In Haines, restrictive regulations, in combination with poor runs of chinook salmon and elimination of the local salmon derby, limited the total effort in 1989 to 36% of the average for the years 1985-1988. Bottomfish effort in the Haines fishery was below average partially due to the termination of surveys on June 25 instead of mid-July. Within all of these fisheries, bottomfish effort in late June and early July is usually substantial. During the spring period 80% to 90% of the effort within the fisheries is for salmon. During July, anglers target on bottomfish much more (Bingham, et al. 1988).

### Chinook Salmon Fisheries

Total harvests of chinook salmon for the surveyed marine boat fisheries were generally above average except in the Haines fishery which had a harvest that was only about 21% of average (Table 16). The small harvest of chinook salmon in the Haines fishery was partially due to very restrictive sport regulations (Appendix A). In addition, the run of chinook salmon to the Chilkat River was weak. Low harvest rates led to in-season management in the form of a complete closure of the chinook salmon fishery in Chilkat and Chilkoot inlets on 19 June. Harvest of chinook salmon in the Juneau Golden North Salmon Derby was also below average and the lowest since 1980 (Table 16).

Harvest of chinook salmon in the Ketchikan fishery was the highest recorded at 137% of the 1977-1988 average. The estimated number of undersize chinook salmon released in the Ketchikan fishery increased from 15,804 in 1988 (Suchanek and Bingham 1989) to 32,560 in 1989 (Table 2, Appendix C1). If these catches are an indicator to juvenile chinook salmon abundance, then chinook salmon harvests in the Ketchikan area should continue to increase as juvenile fish reach legal size. Chinook salmon harvests in Sitka during 1989 were almost 3 times the 1986-1988 average for a similar time period. This increase is thought to be primarily due to a large increase in chinook salmon abundance in outside waters.

Harvest of chinook salmon in the Juneau fishery was slightly above average due primarily to increased spring harvests. During the period from 24 April to 18 June 1989, Juneau anglers took an estimated 2,253 large chinook. This harvest is about 1,000 more than the 1,116 large chinook salmon taken during 24 April through 19 June 1988 (Suchanek and Bingham 1989). Much of the spring 1989 harvest of chinook salmon was taken in areas around Taku Inlet closed to chinook salmon fishing from 16 April to 14 June prior to 1989.

Contributions of hatchery chinook salmon to the sampled marine fisheries have increased greatly since 1983 (Table 17). During the last two years, increases in harvests of the Sitka fishery have been partly due to large increases in the number of hatchery fish. The large increase in the hatchery harvest for the Sitka marine fishery during 1989 was primarily due to large harvests of chinook salmon from hatcheries in British Columbia, Washington, and Oregon. The chinook salmon fisheries near Ketchikan and Petersburg have benefitted greatly from

Table 15. Estimated angler effort in the Petersburg, Wrangell, Sitka, and Haines sport fisheries as determined by on-site creel surveys for comparable sample periods.

| Sport Fishery | Year | Survey Dates | Salmon-Hours |         | Bottomfish-Hours |         | Total Angler-hours |
|---------------|------|--------------|--------------|---------|------------------|---------|--------------------|
|               |      |              | Estimate     | Percent | Estimate         | Percent |                    |
| Petersburg    | 1983 | 5/01-7/16    | 9,461        | 70%     | 4,101            | 30%     | 13,562             |
|               | 1984 | 4/29-7/14    | 12,336       | 70%     | 5,205            | 30%     | 17,541             |
|               | 1985 | 4/15-6/30    | 30,981       | 92%     | 2,764            | 8%      | 33,745             |
|               | 1986 | 4/14-6/29    | 20,810       | 84%     | 3,949            | 16%     | 24,759             |
|               | 1987 | 4/20-7/19    | 19,691       | 81%     | 4,501            | 19%     | 24,204             |
|               | 1988 | 4/11-7/17    | 24,952       | 82%     | 5,334            | 18%     | 30,421             |
|               |      | Average      | 19,705       | 82%     | 4,309            | 18%     | 24,039             |
|               | 1989 | 4/10-7/16    | 26,530       | 83%     | 5,536            | 17%     | 32,139             |
|               |      | % of Average | 135%         |         | 128%             |         | 134%               |
|               |      |              |              |         |                  |         |                    |
| Wrangell      | 1983 | 4/17-7/02    | 30,227       | 87%     | 4,641            | 13%     | 34,868             |
|               | 1984 | 4/15-6/30    | 22,194       | 85%     | 4,029            | 15%     | 26,223             |
|               | 1985 | 4/15-6/30    | 29,671       | 87%     | 4,326            | 13%     | 33,997             |
|               | 1986 | 4/14-7/06    | 43,125       | 92%     | 3,984            | 8%      | 47,109             |
|               | 1987 | 4/20-7/19    | 32,812       | 84%     | 6,452            | 16%     | 39,264             |
|               | 1988 | 4/11-7/17    | 29,486       | 85%     | 5,097            | 15%     | 34,583             |
|               |      | Average      | 31,253       | 87%     | 4,755            | 13%     | 36,007             |
|               | 1989 | 4/24-7/16    | 36,512       | 82%     | 7,992            | 18%     | 44,504             |
|               |      | % of Average | 117%         |         | 168%             |         | 124%               |
|               |      |              |              |         |                  |         |                    |
| Sitka         | 1986 | 4/14-6/29    | 31,661       | 77%     | 9,210            | 23%     | 40,871             |
|               | 1987 | 4/20-7/05    | 19,942       | 65%     | 10,642           | 35%     | 30,685             |
|               | 1988 | 4/11-7/03    | 24,114       | 76%     | 7,247            | 23%     | 31,715             |
|               |      | Average      | 25,239       | 73%     | 9,033            | 26%     | 34,424             |
|               | 1989 | 4/24-7/02    | 34,946       | 84%     | 6,177            | 15%     | 41,362             |
|               |      | % of Average | 138%         |         | 68%              |         | 120%               |
| Haines        | 1985 | 4/15-7/15    | 20,582       | 95%     | 1,016            | 5%      | 21,598             |
|               | 1986 | 4/14-7/13    | 32,533       | 96%     | 1,324            | 4%      | 33,857             |
|               | 1987 | 4/20-7/12    | 22,848       | 86%     | 3,773            | 14%     | 26,621             |
|               | 1988 | 4/11-7/10    | 32,723       | 90%     | 3,435            | 9%      | 36,222             |
|               |      | Average      | 27,172       | 92%     | 2,387            | 8%      | 29,575             |
|               | 1989 | 4/24-6/25    | 9,363        | 89%     | 1,108            | 11%     | 10,526             |
|               |      | % of Average | 34%          |         | 46%              |         | 36%                |
|               |      |              |              |         |                  |         |                    |

Table 16. Estimated harvests of chinook salmon in selected marine sport fisheries of southeast Alaska as determined by on-site creel surveys for comparable sample periods.

| Year         | Juneau Marine <sup>a</sup> | Juneau Golden North Derby | Ketchikan Marine | Petersburg Marine | Wrangell Marine | Sitka Marine <sup>b</sup> | Haines Marine |
|--------------|----------------------------|---------------------------|------------------|-------------------|-----------------|---------------------------|---------------|
| 1977         | 4,845                      | 516                       | ---              | ---               | ---             | ---                       | ---           |
| 1978         | 3,020                      | 250                       | ---              | ---               | ---             | ---                       | ---           |
| 1979         | 4,644                      | 1,007                     | ---              | ---               | ---             | ---                       | ---           |
| 1980         | 5,552                      | 477                       | ---              | ---               | ---             | ---                       | ---           |
| 1981         | 4,165                      | 873                       | ---              | ---               | ---             | ---                       | ---           |
| 1982         | 4,670                      | 1,016                     | ---              | ---               | ---             | ---                       | ---           |
| 1983         | 4,316                      | 872                       | ---              | 402               | 1,120           | ---                       | ---           |
| 1984         | 6,474                      | 855                       | 1,820            | 943               | 1,116           | ---                       | 1,082         |
| 1985         | 8,133                      | 1,222                     | ---              | 1,318             | 1,420           | ---                       | 1,709         |
| 1986         | 5,050                      | 1,073                     | 5,006            | 1,070             | 1,812           | 769                       | 1,655         |
| 1987         | 8,893                      | 1,005                     | 4,723            | 1,401             | 1,218           | 546                       | 1,098         |
| 1988         | 5,683                      | 677                       | 5,245            | 1,936             | 1,535           | 2,445                     | 488           |
| Average      | 5,454                      | 820                       | 4,199            | 1,178             | 1,370           | 1,253                     | 1,206         |
| 1989         | 7,074                      | 609                       | 5,752            | 1,414             | 2,051           | 3,501                     | 252           |
| % of Average | 130%                       | 74%                       | 137%             | 120%              | 150%            | 279%                      | 21%           |

<sup>a</sup> Includes Juneau Golden North Salmon Derby Harvest.

<sup>b</sup> Total harvest for Sitka as estimated from approximately mid-April to 1 July.

Table 17. Estimated contributions of hatchery produced chinook salmon to selected marine sport fisheries of southeast Alaska as determined by on-site creel surveys, 1983-1989.

| Year    | Juneau Marine     |              | Ketchikan Marine  |              | Sitka Marine      |              | Petersburg Marine |              | Wrangell Marine   |              | Haines Marine     |              |
|---------|-------------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|
|         | Hatchery Contrib. | % of Harvest | Hatchery Contrib. | % of Harvest | Hatchery Contrib. | % of Harvest | Hatchery Contrib. | % of Harvest | Hatchery Contrib. | % of Harvest | Hatchery Contrib. | % of Harvest |
| 1983    | 46                | 1%           | 350               | 10%          | --                | --           | 23                | 6%           | 0                 | 0%           | --                | --           |
| 1984    | 577               | 9%           | 432               | 24%          | --                | --           | 140               | 15%          | 66                | 6%           | 0                 | 0            |
| 1985    | 1,037             | 13%          | 862               | 34%          | --                | --           | 371               | 28%          | 0                 | 0%           | 0                 | 0            |
| 1986    | 1,032             | 20%          | 2,226             | 44%          | 37                | 5%           | 290               | 27%          | 188               | 10%          | 0                 | 0            |
| 1987    | 2,060             | 23%          | 1,409             | 30%          | 150               | 6%           | 670               | 48%          | 5                 | <1%          | 14                | 1%           |
| 1988    | 1,210             | 22%          | 1,747             | 33%          | 1,026             | 32%          | 860               | 44%          | 225               | 15%          | 0                 | 0            |
| Average | 994               | 15%          | 1,171             | 31%          | 404               | 19%          | 392               | 33%          | 81                | 6%           | 3                 | <1%          |
| 1989    | 1,018             | 14%          | 2,992             | 52%          | 1,185             | 34%          | 456               | 32%          | 258               | 13%          | 8                 | 3%           |

nearby hatcheries; in 1989 the Ketchikan chinook salmon harvest was 52% hatchery fish (Table 3).

### Coho Salmon Fisheries

Harvests of coho salmon in the Juneau areas was the highest ever recorded at 177% of the 1977 to 1988 average (Table 18). The Juneau Golden North Salmon derby harvest of coho salmon was also above average and the highest since 1982. In Ketchikan, the 1989 harvest of 10,781 coho salmon was only 84% of recent year average harvests, but was double that of 1988.

After a dismal performance in 1988, nearby hatcheries contributed much more to the Ketchikan fishery during 1989, producing 11% of the coho salmon taken. This contribution is still well below average for the past few years (Table 19). In Juneau, hatchery contributions of coho salmon were the highest in recent years, but wild stocks still support most of the harvest. Only about 3% of the Juneau harvest of coho salmon has been of hatchery origin.

### Bottomfish Fisheries

In contrast to harvests of salmon species, Pacific halibut harvests have been relatively stable over the past few years. The harvest of Pacific halibut in 1989 was 91% of the 1983 to 1988 average in the Juneau fishery, while Ketchikan anglers took an above average (124%) harvest of Pacific halibut (Table 20). Juneau anglers have harvested about 13,700 Pacific halibut annually while Ketchikan anglers have taken about 8,700. In Ketchikan, an average of about 83% of the Pacific halibut caught are harvested, while in Juneau, the retention rate is about 67%.

Rockfish harvests and catches have been declining in the Ketchikan and Sitka areas over the past three years (Table 21). Available data on species composition indicate that the harvest of quillback rockfish in both Ketchikan and Sitka has declined greatly over the past three years (Table 22). In Sitka, yelloweye rockfish harvests have also declined during the spring. These species both have limited home ranges and are slow growing. New restrictive bag limits placed into effect during 1989 may have some effect in preserving stocks of these two species in the future. Unfortunately, rockfish that are released often subsequently die because their air bladders cannot adjust to rapid changes in atmospheric pressure.

### Shellfish Fisheries

Data were collected on personal use and subsistence crab harvests in the marine fisheries for the second year. Estimated shellfish effort in the Juneau area increased by 16% in 1989 from that estimated in 1988 (Table 23). Harvests of crab also increased, with the harvest of king crab more than tripling from 1988 to 1989. In Ketchikan, however, shellfish effort declined dramatically in 1989, as the estimated effort was only 36% of that recorded in 1988. Harvests of crab and shrimp were also reduced, although the harvest of shrimp per boat-day was larger in 1989. Harvest of Dungeness crab per boat-day in Ketchikan during 1989 was 82% of that recorded in 1988, but still above that recorded in Juneau.

Table 18. Estimated harvests of coho salmon in the Juneau and Ketchikan marine sport fisheries as determined by on-site creel surveys for comparable sample periods.

| Year         | Juneau <sup>a</sup><br>Marine | Juneau Golden<br>North Derby | Ketchikan<br>Marine |
|--------------|-------------------------------|------------------------------|---------------------|
| 1977         | 13,084                        | 3,625                        | ---                 |
| 1978         | 16,697                        | 2,855                        | ---                 |
| 1979         | 10,150                        | 3,224                        | ---                 |
| 1980         | 11,694                        | 2,277                        | ---                 |
| 1981         | 8,661                         | 1,764                        | ---                 |
| 1982         | 20,747                        | 5,320                        | ---                 |
| 1983         | 12,662                        | 2,964                        | ---                 |
| 1984         | 10,100                        | 1,594                        | 14,231              |
| 1985         | 17,138                        | 2,919                        | ---                 |
| 1986         | 9,763                         | 367                          | 20,814              |
| 1987         | 17,610                        | 3,056                        | 10,464              |
| 1988         | 12,017                        | 1,453                        | 5,525               |
| Average      | 13,482                        | 2,726                        | 12,759              |
| 1989         | 23,819                        | 3,173                        | 10,781              |
| % of Average | 177%                          | 116%                         | 84%                 |

<sup>a</sup> Includes Juneau Golden North Salmon Derby harvest.

Table 19. Estimated contributions of hatchery produced coho salmon to the Juneau and Ketchikan marine sport fisheries as determined by on-site creel surveys.

| Year    | Juneau Marine     |                    | Ketchikan Marine  |                    |
|---------|-------------------|--------------------|-------------------|--------------------|
|         | Hatchery Contrib. | Percent of Harvest | Hatchery Contrib. | Percent of Harvest |
| 1983    | 227               | 2%                 | --                | --                 |
| 1984    | 52                | 1%                 | 5,181             | 36%                |
| 1985    | 1,353             | 8%                 | --                | --                 |
| 1986    | 37                | <1%                | 3,200             | 15%                |
| 1987    | 94                | 1%                 | 4,663             | 45%                |
| 1988    | 262               | 2%                 | 292               | 5%                 |
| Average | 338               | 3%                 | 3,334             | 26%                |
| 1989    | 930               | 4%                 | 1,147             | 11%                |

Table 20. Estimated harvests and catches of Pacific halibut in the Juneau and Ketchikan marine sport fisheries, 1983-1989.

| Year         | Juneau Marine |          |         |          | Ketchikan Marine |          |         |          |
|--------------|---------------|----------|---------|----------|------------------|----------|---------|----------|
|              | Kept          | Released | Percent |          | Kept             | Released | Percent |          |
|              |               |          | Total   | Retained |                  |          | Total   | Retained |
| 1983         | 16,414        | 4,674    | 21,088  | 78%      | ---              | ---      | ---     | ---      |
| 1984         | 14,609        | 9,100    | 23,709  | 62%      | 8,913            | 748      | 9,661   | 92%      |
| 1985         | 11,931        | 3,955    | 15,886  | 75%      | ---              | ---      | ---     | ---      |
| 1986         | 13,132        | 6,868    | 20,000  | 66%      | 8,208            | 1,577    | 9,785   | 84%      |
| 1987         | 13,513        | 10,357   | 23,870  | 57%      | 10,493           | 3,390    | 13,883  | 76%      |
| 1988         | 12,672        | 5,027    | 17,699  | 72%      | 7,317            | 1,338    | 8,655   | 85%      |
| Average      | 13,712        | 6,664    | 20,375  | 67%      | 8,733            | 1,763    | 10,496  | 83%      |
| 1989         | 12,484        | 2,406    | 14,890  | 84%      | 10,797           | 1,256    | 12,053  | 90%      |
| % of Average | 91%           | 36%      | 73%     |          | 124%             | 71%      | 115%    |          |

Table 21. Comparative catch and effort statistics for the Ketchikan and Sitka rockfish sport fisheries.

| Year              | Survey Dates           | Angler Effort      |                  | Total Rockfish Harvest and Catch |          |             |                | Harvest Rates         |                           | Catch Rates           |                           |
|-------------------|------------------------|--------------------|------------------|----------------------------------|----------|-------------|----------------|-----------------------|---------------------------|-----------------------|---------------------------|
|                   |                        | Total Angler-Hours | Bottomfish-Hours | Kept                             | Released | Total Catch | Retention Rate | Targeted <sup>a</sup> | Non-Targeted <sup>b</sup> | Targeted <sup>c</sup> | Non-Targeted <sup>d</sup> |
| Ketchikan         |                        |                    |                  |                                  |          |             |                |                       |                           |                       |                           |
| 1984              | 4/29-9/29              | 223,725            | 62,625           | 9,805                            | ---      | ---         | ---            | 0.16                  | 0.04                      | ---                   | ---                       |
| 1985 <sup>e</sup> | 4/15-6/30              | ---                | ---              | ---                              | ---      | ---         | ---            | ---                   | ---                       | ---                   | ---                       |
| 1986              | 4/28-9/28              | 184,726            | 51,208           | 6,017                            | 7,527    | 13,544      | 44%            | 0.12                  | 0.03                      | 0.26                  | 0.07                      |
| 1987              | 4/20-9/27              | 242,274            | 84,954           | 18,591                           | 27,539   | 46,130      | 40%            | 0.22                  | 0.08                      | 0.54                  | 0.19                      |
| 1988              | 4/11-9/25              | 225,779            | 71,611           | 17,477                           | 15,516   | 32,993      | 53%            | 0.24                  | 0.08                      | 0.46                  | 0.15                      |
| 1989              | 4/24-9/24              | 276,516            | 79,958           | 11,224                           | 6,742    | 17,966      | 62%            | 0.14                  | 0.04                      | 0.22                  | 0.06                      |
| Sitka             |                        |                    |                  |                                  |          |             |                |                       |                           |                       |                           |
| 1986              | 4/14-6/29              | 40,871             | 9,210            | 1,850                            | 5,657    | 7,507       | 25%            | 0.20                  | 0.05                      | 0.82                  | 0.18                      |
| 1987              | 4/20-7/05 <sup>f</sup> | 30,685             | 10,642           | 2,378                            | 8,802    | 11,180      | 21%            | 0.22                  | 0.08                      | 1.05                  | 0.36                      |
| 1988              | 4/11-7/03 <sup>f</sup> | 31,715             | 7,247            | 1,516                            | 8,854    | 10,370      | 15%            | 0.21                  | 0.05                      | 1.43                  | 0.33                      |
| 1989              | 4/24-7/02              | 41,362             | 6,177            | 683                              | 4,459    | 5,142       | 13%            | 0.11                  | 0.02                      | 0.83                  | 0.12                      |

<sup>a</sup> Rockfish harvest per angler-hour of effort.

<sup>b</sup> Rockfish harvest per bottomfish-hour of effort.

<sup>c</sup> Rockfish catch per angler-hour of effort.

<sup>d</sup> Rockfish catch per bottomfish-hour of effort.

<sup>e</sup> Data not comparable since creel surveys extended only through June 30 instead of late September.

<sup>f</sup> Surveys extended through 9/13 in 1987 and 9/25 in 1988, although for comparative purposes, data are presented only through the noted time periods.

Table 22. Species composition of the rockfish harvest in the Ketchikan and Sitka sport fisheries for comparable time periods, 1987-1989.

| Species             | Ketchikan Rockfish Harvest |        |        |        | Sitka Rockfish Harvest |       |      |       |
|---------------------|----------------------------|--------|--------|--------|------------------------|-------|------|-------|
|                     | 1987                       | 1988   | 1989   | Mean   | 1987                   | 1988  | 1989 | Mean  |
| Black Rockfish      | 698                        | 449    | 467    | 538    | 615                    | 138   | 108  | 287   |
| Boccacio            | --- <sup>a</sup>           | ---    | ---    | ---    | ---                    | 242   | 18   | 130   |
| Copper Rockfish     | 262                        | 778    | 30     | 356    | 25                     | 0     | 31   | 19    |
| Dusky Rockfish      | 215                        | 774    | 21     | 337    | 335                    | 46    | 89   | 157   |
| Quillback Rockfish  | 10,202                     | 8,306  | 3,237  | 7,248  | 926                    | 764   | 161  | 617   |
| Silvergrey Rockfish | ---                        | 1,117  | 1,867  | 995    | ---                    | ---   | ---  | ---   |
| Yelloweye Rockfish  | 5,516                      | 4,310  | 4,813  | 4,880  | 416                    | 296   | 35   | 249   |
| Yellowtail Rockfish | 122                        | 142    | 6      | 90     | 0                      | 12    | 0    | 4     |
| Other Rockfish      | 1,577                      | 1,601  | 784    | 1,321  | 61                     | 18    | 241  | 107   |
| Total               | 18,591                     | 17,477 | 11,224 | 15,764 | 2,378                  | 1,516 | 683  | 1,570 |

<sup>a</sup> Harvest of this species not estimated for this location and year.

Table 23. Comparison of estimated shellfish effort and harvest between 1988 and 1989 for the Juneau and Ketchikan marine boat fisheries.

|                    | Juneau          |       |                 | Ketchikan |        |                  |
|--------------------|-----------------|-------|-----------------|-----------|--------|------------------|
|                    | 1988            | 1989  | Percent of 1988 | 1988      | 1989   | Percent of 1988  |
| Effort (Boat-Days) | 2,287           | 2,652 | 116%            | 1,398     | 508    | 36%              |
| Dungeness Crab     |                 |       |                 |           |        |                  |
| Harvest            | 6,459           | 8,356 | 129%            | 9,043     | 2,688  | 30%              |
| Harvest / Boat-day | 2.82            | 3.15  | 112%            | 6.47      | 5.29   | 82%              |
| Tanner Crab        |                 |       |                 |           |        |                  |
| Harvest            | 3,042           | 3,369 | 111%            | 0         | 100    | --- <sup>a</sup> |
| Harvest / Boat-day | 1.33            | 1.27  | 95%             | 0.00      | 0.20   | --- <sup>a</sup> |
| King Crab          |                 |       |                 |           |        |                  |
| Harvest            | 552             | 1,849 | 335%            | 0         | 0      | --- <sup>a</sup> |
| Harvest / Boat-day | 0.24            | 0.70  | 291%            | 0.00      | 0.00   | --- <sup>a</sup> |
| Shrimp             |                 |       |                 |           |        |                  |
| Harvest            | (Not Estimated) |       |                 | 27,643    | 12,730 | 46%              |
| Harvest / Boat-day |                 |       |                 | 19.77     | 25.06  | 127%             |

<sup>a</sup> Could not be calculated.

Reasons for the decrease in crab effort in Ketchikan are unknown, as finfish angler effort increased during 1989.

#### CONCLUSIONS AND RECOMMENDATIONS

Large changes in southeast Alaska sport fisheries have occurred over the past decade. Effort has steadily risen in most fisheries as the numbers of both local residents and tourists have increased. Wild stocks of fish support most of the sport fisheries, but increasing enhancement efforts have led to increases in harvests of hatchery chinook and coho salmon. These enhancement efforts can be costly and creel surveys are one of the few means to evaluate the success of these programs. In contrast with 1988, contributions of hatchery coho salmon to sport fisheries during 1989 were good and the chinook salmon fisheries also benefitted greatly from enhancement. Creel surveys of marine boat fisheries will continue to be necessary to evaluate and improve the effectiveness of stocking programs.

Data from existing marine boat surveys are also used for a variety of other purposes and the program should be continued. Continuing the shellfish harvest estimates as a component of the ongoing marine harvest studies will provide valuable information to evaluate performance of this fishery and to comment upon potential regulation changes during Alaska Board of Fisheries meetings. The Juneau and Ketchikan boat fisheries are the largest and most controversial sport fisheries in the region, and monitoring of these complex fisheries is essential. Performance data and biological information gathered from monitoring of the Haines chinook salmon boat fishery will provide necessary data about efforts to rebuild Chilkat River stocks of chinook salmon.

Marine boat fisheries in Petersburg, Wrangell, and Sitka are primarily targeted on chinook salmon, and harvest rates are excellent in comparison to the Juneau and Ketchikan fisheries. In-season monitoring of the harvests and hatchery contributions of chinook salmon for the Petersburg, Wrangell, and Sitka fisheries is used for U.S./Canada in-season and post-season reporting purposes, as well as for public education and regulatory analysis. Although monitoring is not necessary for in-season sport fish management, these fisheries constitute a significant portion of the sport fishing effort in the central portion of the region. Given U.S./Canada treaty catch limits on chinook salmon, current user group conflicts over catch allocations may intensify. With no current information on fishery performance or catch composition in these fisheries, rational management of combined sport and commercial chinook salmon fisheries will be more difficult. Harvests of Pacific halibut, rockfish, and coho salmon within the Sitka marine fishery are also substantial, and the Sitka fishery will probably continue to develop rapidly due to growth in the charter boat industry.

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## LITERATURE CITED

- Bingham, A. E., Suchanek, P. M., Sonnichsen, S. and R. D. Mecum. 1988. Harvest estimates for selected sport fisheries in southeast Alaska in 1987. Alaska Department of Fish and Game. Fishery Data Series, Number 72, Juneau, Alaska, USA.
- Clark, J. E., and D. R. Bernard. 1987. A compound binomial-hypergeometric distribution describing coded microwire tag recovery from commercial salmon catches in southeastern Alaska. Alaska Department of Fish and Game, Informational Leaflet, Number 261, Juneau, Alaska, USA.
- Cochran, W. G. 1977. Sampling techniques. John Wiley and Sons, New York, New York, USA.
- Goodman, L. A. 1960. On the exact variance of products. Journal of the American Statistical Association 55:708-713.
- Kish, L. 1965. Survey sampling. John Wiley and Sons, New York, New York, USA.
- Kramer D. E. and V. M. O'Connell. 1988. Guide to northeast Pacific rockfishes general *Sebastes* and *Sebastolobus*. University of Alaska. Marine Advisory Bulletin #25. Fairbanks, Alaska, USA.
- INPFC (International North Pacific Fisheries Commission). 1963. Annual Report 1961, Vancouver, British Columbia.
- Marriott, R. A., A. E. Schmidt, and D. E. Jones. 1979. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1978-1979, Project F-9-11, Volume 20 (G-I-Q), Juneau, Alaska, USA.
- Mattson, R. W. 1975. The Juneau area chinook salmon fisheries, with particular emphasis on the sport fishery, 1960-1973. Master's Thesis, University of Washington, Seattle, USA.
- Mecum, R. D., and P. M. Suchanek. 1986. Southeast Alaska sport harvest estimates. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1985-1986, Project F-10-1, Volume 27 (S-1-1), Juneau, Alaska, USA.
- Mecum, R. D., and P. M. Suchanek. 1987. Harvest estimates of selected sport fisheries in southeast Alaska in 1986. Alaska Department of Fish and Game, Fisheries Data Series, Number 21, Juneau, Alaska, USA.
- Neimark, L. M. 1984. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1983-1984, Project F-9-16, Volume 25 (G-I-Q-1), Juneau, Alaska, USA.
- Neimark, L. M. 1985. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1984-1985, Project F-9-17, Volume 26 (AFS-41-12B), Juneau, Alaska, USA.

LITERATURE CITED (Continued)

- Neimark, L. M., and M. W. Schwan. 1983. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1982-1983, Project F-9-15, Volume 24 (G-I-Q-B), Juneau, Alaska, USA.
- Neuhold, J. M., and K. H. Lu. 1957. Creel census method. Utah State Department of Fish and Game Publication 8, Salt Lake City, Utah, USA.
- Quinn, T. J., II, E. A. Best, L. Bijsterveld, and I. R. McGregor. 1983. Sampling Pacific halibut (*Hippoglossus stenolepis*) landings from age composition: history, evaluation, and estimation. International Pacific Halibut Commission, Scientific Report Number 68, Seattle, Washington, USA.
- Robards, F. S. 1976. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1975-1976, Project F-9-8, Volume 17 (G-I-Q), Juneau, Alaska, USA.
- Robards, F. S. 1977. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1976-1977, Project F-9-9, Volume 18 (G-I-Q), Juneau, Alaska, USA.
- Robards, F. S. 1978. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1977-1978, Project F-9-10, Volume 19 (G-I-Q), Juneau, Alaska, USA.
- Schmidt, A. E., and F. S. Robards. 1974. Inventory and cataloging of the sportfish and sport fish waters in southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1973-1974, Project F-9-6, Volume 15 (G-I-A), Juneau, Alaska, USA.
- Schmidt, A. E., and F. S. Robards. 1975. Inventory and cataloging of the sportfish and sport fish waters in southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1974-1975, Project F-9-7, Volume 16 (G-I-A), Juneau, Alaska, USA.
- Schmidt, A. E., F. S. Robards, and M. McHugh. 1973. Inventory and cataloging of the sportfish and sport fish waters in southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Progress Report 1972-1973, Project F-9-5, Volume 14 (G-I-A), Juneau, Alaska, USA.
- Schwan, M. W. 1980. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1979-1980, Project F-9-12, Volume 21 (G-I-Q-B), Juneau, Alaska, USA.
- Schwan, M. W. 1981. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1980-1981, Project F-9-13, Volume 22 (G-I-Q-B), Juneau, Alaska, USA.

#### LITERATURE CITED (Continued)

- Schwan, M. W. 1982. Harvest estimates of selected fisheries throughout southeast Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1981-1982, Project F-9-14, Volume 23 (G-I-Q-B), Juneau, Alaska, USA.
- Suchanek, P. M. and A. E. Bingham. 1989. Harvest estimates for selected sport fisheries in southeast Alaska in 1988. Alaska Department of Fish and Game, Fishery Data Series No. 114, Juneau, Alaska, USA.
- Suchanek, P. M. and A. E. Bingham. 1990. Harvest estimates for selected enhanced roadside sport fisheries near Juneau, Alaska during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-38, Anchorage, Alaska, USA.
- Van Alen, B. W. 1988. Feasibility of using scale and tag data to estimate origins of chinook salmon harvested in southeast Alaska fisheries in 1982. Alaska Department of Fish and Game. Fishery Research Bulletin 88-04, Juneau, Alaska, USA.

APPENDIX A  
SPECIAL CHINOOK SALMON REGULATIONS FOR 1989

Appendix A1. Special regulations affecting the taking of chinook salmon in southeastern Alaska sport fisheries during 1989.

Ketchikan Marine

There were a number of areas near Ketchikan that were opened to the retention of small chinook salmon (less than 28" in total length) from 10 June to 31 August. These included Neets Bay, Herring Bay, and Carroll Inlet Special Harvest Areas along with terminal areas in Thorne Bay and near Brennan Lakes (Cholmondeley Sound) on the east shore of Prince of Wales Island. Thomas Basin in downtown Ketchikan was also opened to the retention of small chinook salmon.

Petersburg Marine

A portion of Wrangell Narrows off the mouth of Blind Slough near the Crystal Lake hatchery was opened to the retention of small chinook salmon (less than 28" in total length) from 10 June through 3 July. This area encompassed all of Wrangell Narrows north of a line from North Point to Spruce Point and south of the latitude of Island Point. After 3 July, this area was completely closed to chinook salmon fishing due to poor returns to the Crystal Lake hatchery. Although substantially further away, another saltwater area near southern Blind Slough adjacent to Sumner Strait was also opened to the retention of small chinook salmon.

Wrangell Marine

Earl West Cove and a portion of Eastern Passage south of Wrangell was opened to the retention of small chinook salmon from 25 June through 31 August. Another area open to the taking of small chinook salmon and within day trip distance of Wrangell anglers was a saltwater area near southern Blind Slough adjacent to Sumner Strait (also mentioned for the Petersburg fishery).

Sitka Marine

There were no areas within day trip distance of Sitka open to the retention of small chinook salmon.

Juneau Marine

A terminal harvest area in Juneau saltwater was opened to the taking of small chinook salmon from June 10 through July 31 and (since chinook continued to be available) from 14 August to 30 September. The terminal area encompassed Gastineau Channel east of a line from Dupont Pier and then extended west and north to Fritz Cove and Auke Bay inside of a line from False Outer Point to Indian Point.

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Haines Marine

Special regulations limiting the chinook salmon harvest applied in the Haines area during 1989. Chilkat Inlet, north of a line extending from Anchorage Point to a department marker directly north of the Letnikof Cove boat ramp, was closed to fishing for chinook salmon from 15 April through 31 July. The seasonal bag limit was 2 chinook salmon per angler from 15 April through 31 July in salt waters south of the latitude of Taiya Point and north of the latitude of the northern tip of Sullivan Island. Upon catching a chinook salmon within this area, anglers were required to record the date and location of their catch on a Haines Area Chinook Salmon Harvest Record. Due to low catch rates, the chinook salmon fishery in Chilkat and Chilkoot inlets was closed on 19 June, and the creel survey was terminated on 25 June as very little other effort was occurring. On July 16, Chilkat Inlet south of the latitude of Glacier Point and Chilkoot Inlet were again reopened to chinook salmon fishing as commercial catches of mature chinook salmon were minimal.

There were no areas within day trip distance of Haines open to the retention of small chinook salmon.



APPENDIX B  
SAMPLING STRATIFICATION STRUCTURE

Appendix B1.        Sampling stratification structure used in southeast marine creel surveys during 1989.

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Ketchikan Marine

Seven sampling locations along the Ketchikan roadside system were assigned to access strata as follows:

1.    Heavy use docks and boat launches:
  - a.    Bar Harbor - divided into 3 separate sections for sampling;
  - b.    Clover Pass resort;
  - c.    Knudsen Cove harbor; and
  - d.    Salmon Falls resort;
2.    Low use docks and boat launches:
  - a.    Mountain Point boat launch;
  - b.    Hole in the Wall harbor; and
  - c.    Thomas Basin harbor.

These access points were also sampled in 1988, but in 1988 Bar Harbor was divided into 4 sections and the heavy/low use harbor strata were somewhat different (Suchanek and Bingham 1989). Due to the lengthy travel times between some of the harbors, only one harbor was sampled by each technician per sampling day.

During the first 2 biweeks of the season, there was only 1 sampler employed to do surveys. This necessitated dropping the heavy/low use harbor stratification for these two biweeks to allow for calculation of estimates and variances.

By allocating samples in proportion to the amount of expected effort, samples were allocated as follows for biweeks 12 to 19:

| <u>Harbor Type</u> | <u>Day Type</u> | <u>Period of Day</u> | <u>Number of Samples</u> |
|--------------------|-----------------|----------------------|--------------------------|
| Heavy Use          | Weekday         | Morning              | 4                        |
|                    |                 | Evening              | 10                       |
|                    | Weekend/Holiday | Morning              | 2                        |
|                    |                 | Evening              | 6                        |
| Low Use            | Weekday         | Morning              | 2                        |
|                    |                 | Evening              | 2                        |
|                    | Weekend/Holiday | Morning              | 2                        |
|                    |                 | Evening              | 2                        |

In biweeks with holidays, sampling effort at the heavy use docks changed to 3 samples in the morning and 8 samples in the evening for both the weekday and weekend/holiday strata.

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### Petersburg Marine

Both the North/Middle and South harbors were assigned to the high use access strata. Samples were generally allocated as follows:

| <u>Harbor Type</u> | <u>Day Type</u> | <u>Period of Day</u> | <u>Number of Samples</u> |
|--------------------|-----------------|----------------------|--------------------------|
| Heavy Use          | Weekday         | Morning              | 4                        |
|                    |                 | Evening              | 8                        |
|                    | Weekend/Holiday | Morning              | 4                        |
|                    |                 | Evening              | 4                        |

During the biweek from 22 May to 4 June, the dates of 3 and 4 June were defined as weekdays because the derby took place on the previous weekend.

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### Wrangell Marine

The two access locations (Town and Shoemaker harbors) sampled in Wrangell were both defined as high use strata. In the late day, Town Harbor was split into the Inner Town Harbor and Outer Town Harbor access locations. During early day samples, however, the entire Town Harbor was sampled.

By allocating samples in proportion to the amount of expected effort, samples were allocated as follows:

| <u>Harbor Type</u> | <u>Day Type</u> | <u>Period of Day</u> | <u>Number of Samples</u> |
|--------------------|-----------------|----------------------|--------------------------|
| Heavy Use          | Weekday         | Morning              | 2                        |
|                    |                 | Evening              | 10                       |
|                    | Weekend/Holiday | Morning              | 2                        |
|                    |                 | Evening              | 6                        |

During biweeks with a holiday, 8 samples were allocated to both of the evening strata. The King Salmon Derby in Wrangell was held from 13 May to 29 May 1989. It was not treated as a separate stratum for sampling or estimation purposes.

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### Sitka Marine

The three access locations sampled in Sitka included Crescent, Sealing Cove, and Thompson harbors, and all were defined as high use.

By allocating samples in proportion to the amount of expected effort, samples were allocated as follows:

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| <u>Harbor Type</u> | <u>Day Type</u> | <u>Period of Day</u> | <u>Number of Samples</u> |
|--------------------|-----------------|----------------------|--------------------------|
| Heavy Use          | Weekday         | Morning              | 4                        |
|                    |                 | Evening              | 8                        |
|                    | Weekend/Holiday | Morning              | 4                        |
|                    |                 | Evening              | 4                        |

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#### Juneau Marine

Access locations were assigned to access strata as follows for the period from 24 April to 18 June:

1. Heavy use docks and boat launches:
  - a. Auke Bay "docks": Auke Bay boat launch and Dehart's Marina, during the early day stratum;
  - b. Auke Bay boat launch, during the late day stratum;
  - c. Fishermen's Bend marina;
  - d. Dehart's Marina, during the late day stratum;
  - e. Amalga Harbor;
  - f. Tee Harbor;
  - g. Auke Bay Government dock;
  - h. Douglas Harbor; and
  - i. Aurora Harbor.
3. Low use docks and boat launches:
  - a. Harris Harbor;
  - b. North Douglas boat launch; and
  - c. Tee Harbor area unimproved boat launch.

After 18 June, Douglas and Aurora harbors were assumed to be low use harbors. This change in stratification from 1988 was due to the reduction of the area around Taku Inlet closed to the taking of chinook salmon from 16 April to 14 June. With this change in regulations, it was assumed that these two harbors would be used much more heavily by Juneau anglers in the spring.

By allocating samples in proportion to the amount of expected effort, samples were allocated approximately as follows through 18 June:

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| <u>Harbor Type</u> | <u>Day Type</u> | <u>Period of Day</u> | <u>Number of Samples</u> |
|--------------------|-----------------|----------------------|--------------------------|
| Heavy Use          | Weekday         | Morning              | 6                        |
|                    |                 | Evening              | 26                       |
|                    | Weekend/Holiday | Morning              | 4                        |
|                    |                 | Evening              | 16                       |
| Low Use            | Weekday         | Morning              | 2                        |
|                    |                 | Evening              | 2                        |
|                    | Weekend/Holiday | Morning              | 2                        |
|                    |                 | Evening              | 2                        |

After 18 June, samples were allocated approximately as follows:

| <u>Harbor Type</u> | <u>Day Type</u> | <u>Period of Day</u> | <u>Number of Samples</u> |
|--------------------|-----------------|----------------------|--------------------------|
| Heavy Use          | Weekday         | Morning              | 6                        |
|                    |                 | Evening              | 24                       |
|                    | Weekend/Holiday | Morning              | 4                        |
|                    |                 | Evening              | 14                       |
| Low Use            | Weekday         | Morning              | 2                        |
|                    |                 | Evening              | 4                        |
|                    | Weekend/Holiday | Morning              | 2                        |
|                    |                 | Evening              | 4                        |

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Haines Marine

Due to conservation concerns with chinook salmon in the Haines area, a modification to the basic sampling stratification used in other fisheries was made to allow for weekly estimates of chinook salmon harvests. Three access points were sampled: the Letnikof Cove harbor was classified as heavy use, while the Chilkat State Park launch ramp and the Small Boat Harbor were classified as low use. For the low use harbors, samples were allocated to morning and evening strata, but there was no allocation by weekday or weekend/holidays.

By allocating samples in proportion to the amount of expected effort, samples were allocated approximately as follows on a weekly basis:

| <u>Harbor Type</u> | <u>Day Type</u> | <u>Period of Day</u> | <u>Number of<br/>Samples</u> |
|--------------------|-----------------|----------------------|------------------------------|
| Heavy Use          | Weekday         | Morning              | 2                            |
|                    |                 | Evening              | 2                            |
|                    | Weekend/Holiday | Morning              | 2                            |
|                    |                 | Evening              | 2                            |
| Low Use            | Both            | Morning              | 2                            |
|                    |                 | Evening              | 2                            |

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APPENDIX C  
CREEL SURVEY STATISTICS

Appendix C1. Estimated finfish effort and catches for the Ketchikan marine boat sport fishery, 24 April - 24 September 1989.

|                                     | APPROXIMATE<br>95% C.I. LOWER<br>LIMIT | ESTIMATE | APPROXIMATE<br>95% C.I. UPPER<br>LIMIT |
|-------------------------------------|--|----------|--|
| <b>Finfish Effort<sup>a</sup></b>   |  |          |  |
| Boat-hours                          | 97,187                                 | 106,886  | 116,585                                |
| Salmon-hours                        | 179,904                                | 195,974  | 212,043                                |
| Halibut-hours                       | 69,436                                 | 79,356   | 89,276                                 |
| Rockfish-hours                      | 54                                     | 602      | 1,228                                  |
| Bottomfish-hours                    | 70,045                                 | 79,958   | 89,871                                 |
| Angler-hours                        | 254,211                                | 276,516  | 298,822                                |
| Boat-Days                           | 16,021                                 | 17,792   | 19,563                                 |
| <b>Finfish Harvests<sup>b</sup></b> |  |          |  |
| Total Large Chinook Salmon          | 4,512                                  | 5,495    | 6,478                                  |
| Derby Take-home                     | 311                                    | 474      | 637                                    |
| Derby Entered                       | ---                                    | 346      | ---                                    |
| Derby Take-home & Entered           | 657                                    | 820      | 983                                    |
| Total Small Chinook Salmon          | 101                                    | 257      | 413                                    |
| Derby Take-home & Entered           | 0                                      | 0        | 0                                      |
| Coho Salmon                         | 9,041                                  | 10,781   | 12,521                                 |
| Chum Salmon                         | 371                                    | 540      | 708                                    |
| Sockeye Salmon                      | 11                                     | 75       | 143                                    |
| Pink Salmon                         | 17,809                                 | 22,813   | 27,816                                 |
| Pacific Halibut                     | 8,900                                  | 10,797   | 12,694                                 |
| Steelhead                           | 1                                      | 10       | 36                                     |
| Lingcod                             | 1,238                                  | 1,711    | 2,185                                  |
| Total Rockfish                      | 9,411                                  | 11,224   | 13,036                                 |
| Black Rockfish                      | 179                                    | 362      | 545                                    |
| Copper Rockfish                     | 3                                      | 23       | 55                                     |
| Dusky Rockfish                      | 2                                      | 16       | 37                                     |
| Quillback Rockfish                  | 1,807                                  | 2,509    | 3,210                                  |
| Silvergrey Rockfish                 | 818                                    | 1,447    | 2,075                                  |
| Yelloweye Rockfish                  | 2,892                                  | 3,731    | 4,570                                  |
| Yellowtail Rockfish                 | 1                                      | 5        | 15                                     |
| Other Rockfish                      | 219                                    | 608      | 998                                    |
| Unidentified Rockfish               | 1,904                                  | 2,523    | 3,143                                  |
| <b>Finfish Released<sup>c</sup></b> |  |          |  |
| Small Chinook Salmon                | 27,329                                 | 32,560   | 37,790                                 |
| Large Chinook Salmon                | 12                                     | 115      | 249                                    |
| Coho Salmon                         | 892                                    | 1,707    | 2,522                                  |
| Chum Salmon                         | 4                                      | 45       | 98                                     |
| Pink Salmon                         | 1,475                                  | 2,267    | 3,059                                  |
| Pacific Halibut                     | 705                                    | 1,256    | 1,807                                  |
| Dolly Varden                        | 15                                     | 483      | 1,434                                  |
| Lingcod                             | 55                                     | 233      | 410                                    |
| Total Rockfish                      | 5,380                                  | 6,742    | 8,105                                  |

<sup>a</sup> No lingcod-hours reported.

<sup>b</sup> No cutthroat trout, Dolly Varden, or kelp greenling harvested.

<sup>c</sup> No sockeye salmon, steelhead, cutthroat trout, or kelp greenling released.

Appendix C2. Estimated finfish effort and catches for the Ketchikan marine boat sport fishery by seasonal period, 24 April - 24 September 1989.

|                                | Seasonal Period      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      | Total       |
|--------------------------------|----------------------|----------------------|----------------------|--------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------|
|                                | 24APR89 -<br>07MAY89 | 08MAY89 -<br>21MAY89 | 22MAY89 -<br>04JUN89 | Derby <sup>a</sup> | 05JUN89 -<br>18JUN89 | 19JUN89 -<br>02JUL89 | 03JUL89 -<br>16JUL89 | 17JUL89 -<br>30JUL89 | 31JUL89 -<br>13AUG89 | 14AUG89 -<br>27AUG89 | 28AUG89 -<br>10SEP89 | 11SEP89 -<br>24SEP89 |             |
| Number of Samples              | 10                   | 10                   | 15                   | 21                 | 20                   | 26                   | 26                   | 25                   | 29                   | 30                   | 30                   | 30                   | 272         |
| Number of Boats Counted        | 27                   | 34                   | 63                   | 377                | 160                  | 210                  | 196                  | 200                  | 305                  | 354                  | 307                  | 142                  | 2,375       |
| Number of Boats Interviewed    | 27                   | 34                   | 63                   | 373                | 159                  | 210                  | 195                  | 200                  | 305                  | 353                  | 303                  | 142                  | 2,364       |
| Hours Sampled                  | 62                   | 65                   | 94                   | 137                | 128                  | 167                  | 169                  | 162                  | 189                  | 196                  | 196                  | 192                  | 1,754       |
| Hours Available to Sample      | 1,796                | 1,859                | 1,215                | 1,008              | 1,674                | 1,953                | 1,953                | 1,890                | 1,827                | 1,733                | 1,670                | 1,607                | 20,183      |
| Boat-hours Fished              |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 3,285                | 4,068                | 2,744                | 19,270             | 8,456                | 11,478               | 10,534               | 8,847                | 12,035               | 12,556               | 9,821                | 3,792                | 106,886     |
| Variance                       | 722,911              | 560,887              | 159,276              | 4,079,013          | 1,130,569            | 2,349,609            | 5,074,906            | 1,661,249            | 2,144,010            | 2,482,618            | 2,750,315            | 401,156              | 23,516,519  |
| Salmon-hours Fished            |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 4,117                | 6,671                | 6,254                | 42,387             | 17,131               | 19,046               | 17,584               | 14,661               | 22,560               | 21,765               | 16,965               | 6,833                | 195,974     |
| Variance                       | 4,046,141            | 3,089,770            | 821,456              | 2,090,913          | 7,699,008            | 5,897,617            | 7,354,329            | 5,623,864            | 7,694,580            | 9,267,871            | 9,432,284            | 1,537,738            | 64,555,570  |
| Halibut-hours Fished           |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 2,985                | 2,713                | 673                  | 5,332              | 4,837                | 8,345                | 9,828                | 9,139                | 13,321               | 12,074               | 7,250                | 2,857                | 79,356      |
| Variance                       | 769,248              | 367,510              | 53,420               | 740,220            | 1,363,571            | 2,585,010            | 6,344,329            | 2,375,701            | 4,952,059            | 1,702,981            | 2,158,844            | 1,186,903            | 24,599,804  |
| Rockfish-hours Fished          |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 197                  | 0                    | 0                    | 0                  | 0                    | 0                    | 405                  | 0                    | 0                    | 0                    | 0                    | 0                    | 602         |
| Variance                       | 36,957               | 0                    | 0                    | 0                  | 0                    | 0                    | 61,000               | 0                    | 0                    | 0                    | 0                    | 0                    | 97,957      |
| Bottomfish-hours Fished        |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 3,182                | 2,713                | 673                  | 5,332              | 4,837                | 8,345                | 10,233               | 9,139                | 13,321               | 12,074               | 7,250                | 2,857                | 79,958      |
| Variance                       | 813,597              | 367,510              | 53,420               | 740,220            | 1,363,571            | 2,585,010            | 6,268,356            | 2,375,701            | 4,952,059            | 1,702,981            | 2,158,844            | 1,186,903            | 24,568,173  |
| Angler-hours Fished            |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 7,300                | 9,384                | 6,927                | 47,718             | 21,969               | 27,392               | 27,817               | 24,216               | 36,050               | 33,839               | 24,215               | 9,689                | 276,516     |
| Variance                       | 7,987,827            | 4,916,906            | 1,013,245            | 2,023,359          | 10,021,645           | 11,011,492           | 24,073,307           | 12,782,135           | 17,183,266           | 12,065,265           | 17,667,458           | 3,638,372            | 124,384,277 |
| Boat-days Fished               |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 740                  | 945                  | 674                  | ---                | 1,648                | 2,168                | 2,120                | 1,849                | 2,398                | 2,388                | 2,070                | 794                  | 17,792      |
| Variance                       | 17,550               | 33,713               | 16,011               | ---                | 57,866               | 83,340               | 184,688              | 49,658               | 90,873               | 108,375              | 121,211              | 20,585               | 783,870     |
| Large Chinook Salmon Harvested |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 28                   | 102                  | 228                  | 820                | 1,161                | 935                  | 622                  | 220                  | 429                  | 418                  | 285                  | 246                  | 5,495       |
| Variance                       | 878                  | 4,389                | 3,878                | 6,634              | 77,943               | 34,975               | 26,885               | 7,287                | 36,610               | 17,316               | 8,218                | 16,534               | 241,548     |
| L. Chinook Salmon Released     |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 0                    | 62                   | 0                    | 15                 | 0                    | 0                    | 5                    | 8                    | 0                    | 0                    | 18                   | 8                    | 115         |
| Variance                       | 0                    | 3,802                | 0                    | 344                | 0                    | 0                    | 21                   | 52                   | 0                    | 0                    | 173                  | 48                   | 4,440       |
| Small Chinook Salmon Harvested |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 0                    | 0                    | 17                   | 0                  | 80                   | 0                    | 69                   | 24                   | 0                    | 45                   | 7                    | 15                   | 257         |
| Variance                       | 0                    | 0                    | 237                  | 0                  | 2,657                | 0                    | 2,211                | 323                  | 0                    | 428                  | 41                   | 202                  | 6,099       |
| S. Chinook Salmon Released     |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 583                  | 1,380                | 224                  | 2,192              | 1,505                | 1,758                | 1,726                | 1,740                | 7,174                | 5,841                | 5,901                | 2,535                | 32,560      |
| Variance                       | 116,830              | 279,758              | 11,847               | 164,071            | 69,615               | 309,607              | 232,952              | 156,951              | 2,405,879            | 975,784              | 1,533,125            | 582,772              | 6,839,190   |
| Coho Salmon Harvested          |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 0                    | 0                    | 0                    | 23                 | 43                   | 412                  | 1,038                | 1,446                | 2,482                | 2,357                | 1,979                | 1,001                | 10,781      |
| Variance                       | 0                    | 0                    | 0                    | 256                | 654                  | 20,762               | 105,679              | 135,873              | 178,668              | 110,840              | 154,582              | 49,525               | 756,838     |
| Coho Salmon Released           |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 0                    | 0                    | 0                    | 15                 | 0                    | 0                    | 133                  | 14                   | 233                  | 894                  | 227                  | 191                  | 1,707       |
| Variance                       | 0                    | 0                    | 0                    | 44                 | 0                    | 0                    | 9,228                | 164                  | 16,973               | 124,180              | 10,905               | 4,628                | 166,122     |
| Chum Salmon Harvested          |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 0                    | 0                    | 0                    | 0                  | 8                    | 120                  | 83                   | 44                   | 55                   | 93                   | 75                   | 62                   | 540         |
| Variance                       | 0                    | 0                    | 0                    | 0                  | 51                   | 2,551                | 1,511                | 714                  | 638                  | 681                  | 475                  | 490                  | 7,112       |
| Chum Salmon Released           |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 0                    | 0                    | 0                    | 10                 | 0                    | 24                   | 0                    | 0                    | 0                    | 0                    | 11                   | 0                    | 45          |
| Variance                       | 0                    | 0                    | 0                    | 42                 | 0                    | 552                  | 0                    | 0                    | 0                    | 0                    | 104                  | 0                    | 697         |
| Sockeye Salmon Harvested       |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 0                    | 0                    | 0                    | 0                  | 0                    | 42                   | 0                    | 0                    | 33                   | 0                    | 0                    | 0                    | 75          |
| Variance                       | 0                    | 0                    | 0                    | 0                  | 0                    | 565                  | 0                    | 0                    | 594                  | 0                    | 0                    | 0                    | 1,160       |
| Pink Salmon Harvested          |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 0                    | 0                    | 0                    | 0                  | 0                    | 26                   | 1,175                | 5,122                | 9,326                | 6,157                | 897                  | 110                  | 22,813      |
| Variance                       | 0                    | 0                    | 0                    | 0                  | 0                    | 355                  | 126,863              | 1,088,536            | 2,576,736            | 2,406,142            | 58,800               | 1,016                | 6,258,447   |
| Pink Salmon Released           |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |             |
| Estimate                       | 0                    | 0                    | 0                    | 0                  | 0                    | 10                   | 123                  | 462                  | 1,047                | 427                  | 144                  | 54                   | 2,267       |
| Variance                       | 0                    | 0                    | 0                    | 0                  | 0                    | 81                   | 7,649                | 44,786               | 74,139               | 26,432               | 2,612                | 1,129                | 156,828     |

-(Continued)-

Appendix C2. (page 2 of 2)

|                                 | Seasonal Period      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      | Total   |
|---------------------------------|----------------------|----------------------|----------------------|--------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------|
|                                 | 24APR89 -<br>07MAY89 | 08MAY89 -<br>21MAY89 | 22MAY89 -<br>04JUN89 | Derby <sup>a</sup> | 05JUN89 -<br>18JUN89 | 19JUN89 -<br>02JUL89 | 03JUL89 -<br>16JUL89 | 17JUL89 -<br>30JUL89 | 31JUL89 -<br>13AUG89 | 14AUG89 -<br>27AUG89 | 28AUG89 -<br>10SEP89 | 11SEP89 -<br>24SEP89 |         |
| Pacific Halibut Harvested       |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 96                   | 185                  | 115                  | 497                | 484                  | 1,424                | 1,261                | 1,511                | 2,017                | 1,948                | 755                  | 504                  | 10,797  |
| Variance                        | 794                  | 4,020                | 370                  | 6,686              | 46,952               | 111,259              | 293,985              | 139,125              | 128,356              | 56,146               | 34,149               | 77,919               | 899,759 |
| Pacific Halibut Released        |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 0                    | 0                    | 0                    | 63                 | 90                   | 65                   | 75                   | 191                  | 239                  | 230                  | 191                  | 114                  | 1,256   |
| Variance                        | 0                    | 0                    | 0                    | 2,088              | 3,153                | 1,551                | 2,325                | 23,733               | 8,556                | 16,355               | 9,554                | 8,517                | 75,832  |
| Steelhead Harvested             |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 0                    | 0                    | 0                    | 10                 | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 10      |
| Variance                        | 0                    | 0                    | 0                    | 162                | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 162     |
| Dolly Varden Released           |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 0                    | 0                    | 0                    | 0                  | 0                    | 0                    | 483                  | 0                    | 0                    | 0                    | 0                    | 0                    | 483     |
| Variance                        | 0                    | 0                    | 0                    | 0                  | 0                    | 0                    | 225,934              | 0                    | 0                    | 0                    | 0                    | 0                    | 225,934 |
| Lingcod Harvested               |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 48                   | 0                    | 33                   | 98                 | 52                   | 166                  | 149                  | 255                  | 154                  | 319                  | 264                  | 174                  | 1,711   |
| Variance                        | 1,247                | 0                    | 535                  | 841                | 365                  | 6,573                | 4,275                | 10,526               | 1,334                | 6,629                | 7,435                | 16,187               | 55,946  |
| Lingcod Released                |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 0                    | 20                   | 0                    | 20                 | 72                   | 19                   | 61                   | 0                    | 7                    | 4                    | 29                   | 0                    | 233     |
| Variance                        | 0                    | 397                  | 0                    | 2,746              | 2,189                | 81                   | 2,076                | 0                    | 38                   | 13                   | 334                  | 0                    | 7,874   |
| Unidentified Rockfish Harvested |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 79                   | 0                    | 25                   | 428                | 117                  | 311                  | 312                  | 143                  | 294                  | 425                  | 228                  | 162                  | 2,523   |
| Variance                        | 5,913                | 0                    | 271                  | 18,046             | 3,032                | 7,000                | 9,167                | 4,163                | 10,325               | 11,276               | 12,628               | 14,125               | 95,947  |
| Black Rockfish Harvested        |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 0                    | 0                    | 0                    | 21                 | 22                   | 67                   | 45                   | 8                    | 22                   | 155                  | 14                   | 8                    | 362     |
| Variance                        | 0                    | 0                    | 0                    | 646                | 413                  | 2,065                | 820                  | 52                   | 214                  | 3,945                | 163                  | 47                   | 8,365   |
| Copper Rockfish Harvested       |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 0                    | 0                    | 0                    | 0                  | 0                    | 16                   | 0                    | 0                    | 0                    | 6                    | 0                    | 0                    | 23      |
| Variance                        | 0                    | 0                    | 0                    | 0                  | 0                    | 231                  | 0                    | 0                    | 0                    | 35                   | 0                    | 0                    | 266     |
| Dusky Rockfish Harvested        |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 0                    | 0                    | 0                    | 0                  | 8                    | 8                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 16      |
| Variance                        | 0                    | 0                    | 0                    | 0                  | 51                   | 58                   | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 109     |
| Quillback Rockfish Harvested    |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 132                  | 143                  | 41                   | 79                 | 110                  | 162                  | 148                  | 269                  | 180                  | 881                  | 344                  | 20                   | 2,509   |
| Variance                        | 4,982                | 9,917                | 1,482                | 2,055              | 4,780                | 6,456                | 4,816                | 16,760               | 5,606                | 44,300               | 21,683               | 67                   | 122,904 |
| Silvergrey Rockfish Harvested   |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 28                   | 0                    | 50                   | 105                | 51                   | 8                    | 71                   | 155                  | 504                  | 176                  | 274                  | 24                   | 1,447   |
| Variance                        | 878                  | 0                    | 619                  | 29,216             | 1,140                | 58                   | 1,808                | 6,684                | 40,772               | 3,308                | 14,305               | 85                   | 98,872  |
| Yelloweye Rockfish Harvested    |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 85                   | 41                   | 41                   | 274                | 111                  | 266                  | 403                  | 474                  | 678                  | 642                  | 497                  | 217                  | 3,731   |
| Variance                        | 2,735                | 1,587                | 380                  | 12,849             | 2,505                | 5,071                | 22,093               | 15,307               | 43,911               | 20,577               | 30,679               | 18,337               | 176,030 |
| Yellowtail Rockfish Harvested   |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 0                    | 0                    | 0                    | 0                  | 0                    | 0                    | 5                    | 0                    | 0                    | 0                    | 0                    | 0                    | 5       |
| Variance                        | 0                    | 0                    | 0                    | 0                  | 0                    | 0                    | 24                   | 0                    | 0                    | 0                    | 0                    | 0                    | 24      |
| Other Rockfish Harvested        |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 113                  | 21                   | 25                   | 28                 | 0                    | 8                    | 139                  | 80                   | 89                   | 44                   | 53                   | 8                    | 608     |
| Variance                        | 14,044               | 406                  | 534                  | 1,440              | 0                    | 58                   | 16,105               | 1,366                | 1,738                | 632                  | 1,580                | 19                   | 37,923  |
| All Rockfish Harvested          |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 437                  | 205                  | 182                  | 934                | 418                  | 846                  | 1,125                | 1,130                | 1,768                | 2,330                | 1,410                | 439                  | 11,224  |
| Variance                        | 53,986               | 3,977                | 6,476                | 64,251             | 14,087               | 17,932               | 115,633              | 81,110               | 111,744              | 121,474              | 167,646              | 63,121               | 821,438 |
| All Rockfish Released           |                      |                      |                      |                    |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                        | 203                  | 249                  | 108                  | 615                | 455                  | 860                  | 861                  | 647                  | 882                  | 906                  | 833                  | 125                  | 6,742   |
| Variance                        | 13,674               | 19,738               | 2,580                | 10,768             | 17,399               | 97,905               | 59,112               | 89,377               | 38,489               | 78,966               | 31,755               | 4,404                | 464,169 |

<sup>a</sup> Derby held on weekends of 27-29 May, 3-4 June, and 10-11 June 1989.

Appendix C3.      Estimated finfish effort and catches for the  
Petersburg marine boat sport fishery, 10 April - 16  
July 1989.

|                               | APPROXIMATE<br>95% C.I. LOWER<br>LIMIT | ESTIMATE | APPROXIMATE<br>95% C.I. UPPER<br>LIMIT |
|-------------------------------|--|----------|--|
| Finfish Effort <sup>a</sup>   |  |          |  |
| Boat-hours                    | 11,870                                 | 13,915   | 15,959                                 |
| Salmon-hours                  | 22,137                                 | 26,530   | 30,922                                 |
| Halibut-hours                 | 3,821                                  | 5,536    | 7,320                                  |
| Angler-hours                  | 26,843                                 | 32,139   | 37,436                                 |
| Boat-Days                     | 2,289                                  | 2,623    | 2,956                                  |
| Finfish Harvests <sup>b</sup> |  |          |  |
| Total Large Chinook Salmon    | 1,103                                  | 1,403    | 1,703                                  |
| Derby Take-home and Entered   | ---                                    | 295      | ---                                    |
| Total Small Chinook Salmon    | 2                                      | 11       | 24                                     |
| Derby Take-home & Entered     | ---                                    | 1        | ---                                    |
| Coho Salmon                   | ---                                    | 1        | ---                                    |
| Sockeye Salmon                | 1                                      | 4        | 12                                     |
| Pink Salmon                   | 1                                      | 6        | 16                                     |
| Pacific Halibut               | 794                                    | 1,271    | 1,747                                  |
| Cutthroat Trout               | 1                                      | 5        | 13                                     |
| Dolly Varden                  | 46                                     | 219      | 476                                    |
| Rockfish                      | 10                                     | 53       | 117                                    |
| Finfish Released <sup>c</sup> |  |          |  |
| Small Chinook Salmon          | 347                                    | 534      | 721                                    |
| Large Chinook Salmon          | 9                                      | 39       | 84                                     |
| Pacific Halibut               | 587                                    | 1,252    | 1,939                                  |
| Dolly Varden                  | 5                                      | 23       | 63                                     |

<sup>a</sup> No lingcod-hours or rockfish-hours reported.

<sup>b</sup> No chum salmon, steelhead, lingcod, or kelp greenling harvested.

<sup>c</sup> No coho salmon, chum salmon, sockeye salmon, pink salmon, steelhead, cutthroat trout, lingcod, kelp greenling, or rockfish released.

Appendix C4. Estimated finfish effort and catches for the Petersburg marine boat sport fishery by seasonal period, 10 April - 16 July 1989.

|                                | Seasonal Period      |                      |                      |                      |                    |                      |                      |                      | Total     |
|--------------------------------|----------------------|----------------------|----------------------|----------------------|--------------------|----------------------|----------------------|----------------------|-----------|
|                                | 10APR89 -<br>23APR89 | 24APR89 -<br>07MAY89 | 08MAY89 -<br>21MAY89 | 22MAY89 -<br>04JUN89 | Derby <sup>a</sup> | 05JUN89 -<br>18JUN89 | 19JUN89 -<br>02JUL89 | 03JUL89 -<br>16JUL89 |           |
| Number of Samples              | 20                   | 20                   | 20                   | 12                   | 8                  | 16                   | 20                   | 16                   | 132       |
| Number of Boats Counted        | 43                   | 57                   | 84                   | 54                   | 158                | 59                   | 71                   | 53                   | 579       |
| Number of Boats Interviewed    | 43                   | 57                   | 84                   | 54                   | 158                | 59                   | 71                   | 53                   | 579       |
| Hours Sampled                  | 67                   | 71                   | 71                   | 43                   | 28                 | 57                   | 71                   | 57                   | 464       |
| Hours Available to Sample      | 385                  | 399                  | 420                  | 310                  | 130                | 448                  | 448                  | 441                  | 2,981     |
| Boat-hours Fished              |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 534                  | 996                  | 1,494                | 1,610                | 4,704              | 1,468                | 1,390                | 1,720                | 13,915    |
| Variance                       | 13,891               | 49,862               | 85,280               | 96,735               | 121,188            | 48,984               | 32,296               | 127,510              | 575,745   |
| Salmon-hours Fished            |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 764                  | 1,477                | 2,608                | 3,699                | 10,573             | 3,492                | 2,753                | 1,164                | 26,530    |
| Variance                       | 33,754               | 107,265              | 293,573              | 873,841              | 704,289            | 307,824              | 110,128              | 115,123              | 2,545,798 |
| Halibut-hours Fished           |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 246                  | 243                  | 462                  | 334                  | 134                | 213                  | 865                  | 3,037                | 5,536     |
| Variance                       | 7,695                | 10,131               | 15,740               | 52,354               | 7,395              | 11,208               | 68,881               | 483,873              | 657,276   |
| Angler-hours Fished            |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 1,025                | 1,730                | 3,086                | 4,036                | 10,716             | 3,706                | 3,639                | 4,201                | 32,139    |
| Variance                       | 59,354               | 124,055              | 327,534              | 1,239,100            | 741,401            | 318,774              | 238,561              | 886,522              | 3,935,299 |
| Boat-days Fished               |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 194                  | 313                  | 485                  | 416                  | ---                | 391                  | 391                  | 432                  | 2,623     |
| Variance                       | 1,726                | 2,825                | 7,222                | 3,818                | ---                | 1,719                | 1,944                | 8,551                | 27,806    |
| Large Chinook Salmon Harvested |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 13                   | 31                   | 125                  | 258                  | 295                | 359                  | 269                  | 52                   | 1,403     |
| Variance                       | 45                   | 282                  | 2,646                | 3,863                | ---                | 10,122               | 4,666                | 892                  | 22,518    |
| Large Chinook Salmon Released  |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                    | 34                 | 0                    | 6                    | 0                    | 39        |
| Variance                       | 0                    | 0                    | 0                    | 0                    | 303                | 0                    | 26                   | 0                    | 329       |
| Small Chinook Salmon Harvested |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                    | 1                  | 0                    | 10                   | 0                    | 11        |
| Variance                       | 0                    | 0                    | 0                    | 0                    | ---                | 0                    | 43                   | 0                    | 43        |
| Small Chinook Salmon Released  |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 0                    | 4                    | 56                   | 120                  | 185                | 90                   | 54                   | 24                   | 534       |
| Variance                       | 0                    | 12                   | 540                  | 2,495                | 555                | 872                  | 701                  | 267                  | 5,443     |
| Coho Salmon Harvested          |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                    | 1                  | 0                    | 0                    | 0                    | 1         |
| Variance                       | 0                    | 0                    | 0                    | 0                    | 0                  | 0                    | 0                    | 0                    | 0         |
| Sockeye Salmon Harvested       |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                    | 0                  | 4                    | 0                    | 0                    | 4         |
| Variance                       | 0                    | 0                    | 0                    | 0                    | 0                  | 16                   | 0                    | 0                    | 16        |
| Pink Salmon Harvested          |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                    | 0                  | 0                    | 0                    | 6                    | 6         |
| Variance                       | 0                    | 0                    | 0                    | 0                    | 0                  | 0                    | 0                    | 26                   | 26        |
| Pacific Halibut Harvested      |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 8                    | 47                   | 77                   | 87                   | 63                 | 40                   | 315                  | 633                  | 1,271     |
| Variance                       | 15                   | 904                  | 782                  | 4,772                | 314                | 602                  | 13,335               | 28,308               | 49,033    |
| Pacific Halibut Released       |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 24                   | 20                   | 26                   | 82                   | 67                 | 72                   | 305                  | 656                  | 1,252     |
| Variance                       | 199                  | 327                  | 342                  | 5,350                | 1,314              | 3,874                | 43,077               | 41,201               | 95,685    |
| Cutthroat Trout Harvested      |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                    | 0                  | 0                    | 5                    | 0                    | 5         |
| Variance                       | 0                    | 0                    | 0                    | 0                    | 0                  | 0                    | 16                   | 0                    | 16        |
| Dolly Varden Harvested         |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 10                   | 50                   | 26                   | 0                    | 0                  | 0                    | 133                  | 0                    | 219       |
| Variance                       | 83                   | 2,045                | 554                  | 0                    | 0                  | 0                    | 13,731               | 0                    | 16,413    |
| Dolly Varden Released          |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                    | 0                  | 0                    | 23                   | 0                    | 23        |
| Variance                       | 0                    | 0                    | 0                    | 0                    | 0                  | 0                    | 408                  | 0                    | 408       |
| All Rockfish Harvested         |                      |                      |                      |                      |                    |                      |                      |                      |           |
| Estimate                       | 0                    | 0                    | 31                   | 22                   | 0                  | 0                    | 0                    | 0                    | 53        |
| Variance                       | 0                    | 0                    | 798                  | 217                  | 0                  | 0                    | 0                    | 0                    | 1,016     |

<sup>a</sup> Derby held on 26-29 May weekend.

Appendix C5.      Estimated finfish effort and catches for the  
Wrangell marine boat sport fishery, 24 April - 16  
July 1989.

|                               | APPROXIMATE<br>95% C.I. LOWER<br>LIMIT | ESTIMATE | APPROXIMATE<br>95% C.I. UPPER<br>LIMIT |
|-------------------------------|--|----------|--|
| Finfish Effort <sup>a</sup>   |  |          |  |
| Boat-hours                    | 14,742                                 | 18,316   | 21,889                                 |
| Salmon-hours                  | 27,823                                 | 36,512   | 45,202                                 |
| Halibut-hours                 | 6,037                                  | 7,992    | 9,947                                  |
| Angler-hours                  | 35,557                                 | 44,504   | 53,452                                 |
| Boat-Days                     | 3,178                                  | 3,880    | 4,582                                  |
| Finfish Harvests <sup>b</sup> |  |          |  |
| Large Chinook Salmon          | 1,306                                  | 2,051    | 2,796                                  |
| Pink Salmon                   | 4                                      | 48       | 127                                    |
| Pacific Halibut               | 600                                    | 894      | 1,188                                  |
| Lingcod                       | 6                                      | 41       | 85                                     |
| Rockfish                      | 44                                     | 153      | 262                                    |
| Finfish Released <sup>c</sup> |  |          |  |
| Small Chinook Salmon          | 115                                    | 238      | 362                                    |
| Large Chinook Salmon          | 16                                     | 52       | 88                                     |
| Coho Salmon                   | 2                                      | 8        | 22                                     |
| Pacific Halibut               | 3                                      | 12       | 29                                     |
| Lingcod                       | 1                                      | 4        | 11                                     |
| Rockfish                      | 9                                      | 39       | 101                                    |

<sup>a</sup> No lingcod-hours or rockfish hours reported.

<sup>b</sup> No small chinook salmon, coho salmon, chum salmon, sockeye salmon, steelhead, cutthroat trout, Dolly Varden, or kelp greenling harvested.

<sup>c</sup> No chum salmon, sockeye salmon, pink salmon, steelhead, cutthroat trout, Dolly Varden, or kelp greenling released.

## Appendix C6.

Estimated finfish effort and catches for the Wrangell marine boat sport fishery by seasonal period, 24 April - 16 July 1989.

|                                | Seasonal Period      |                      |                      |                      |                      |                      | Total      |
|--------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------|
|                                | 24APR89 -<br>07MAY89 | 08MAY89 -<br>21MAY89 | 22MAY89 -<br>04JUN89 | 05JUN89 -<br>18JUN89 | 19JUN89 -<br>02JUL89 | 03JUL89 -<br>16JUL89 |            |
| Number of Samples              | 16                   | 20                   | 20                   | 20                   | 20                   | 20                   | 116        |
| Number of Boats Counted        | 64                   | 203                  | 230                  | 47                   | 39                   | 36                   | 619        |
| Number of Boats Interviewed    | 63                   | 198                  | 226                  | 47                   | 37                   | 36                   | 607        |
| Hours Sampled                  | 56                   | 73                   | 74                   | 71                   | 72                   | 71                   | 417        |
| Hours Available to Sample      | 499                  | 516                  | 534                  | 543                  | 551                  | 543                  | 3,185      |
| Boat-hours Fished              |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 1,363                | 6,122                | 7,066                | 1,563                | 1,292                | 911                  | 18,316     |
| Variance                       | 118,683              | 1,875,245            | 1,024,251            | 54,954               | 72,017               | 47,562               | 3,192,713  |
| Salmon-hours Fished            |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 1,716                | 14,021               | 16,720               | 2,276                | 1,296                | 483                  | 36,512     |
| Variance                       | 170,415              | 11,840,890           | 6,371,516            | 295,851              | 156,190              | 42,909               | 18,877,771 |
| Halibut-hours Fished           |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 1,215                | 471                  | 868                  | 1,957                | 1,770                | 1,711                | 7,992      |
| Variance                       | 274,326              | 26,137               | 65,617               | 147,231              | 274,444              | 167,903              | 955,658    |
| Angler-hours Fished            |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 2,931                | 14,492               | 17,588               | 4,233                | 3,066                | 2,194                | 44,504     |
| Variance                       | 713,758              | 11,485,519           | 6,706,928            | 400,460              | 442,587              | 266,748              | 20,016,000 |
| Boat-days Fished               |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 397                  | 1,324                | 1,271                | 356                  | 286                  | 245                  | 3,880      |
| Variance                       | 7,992                | 64,548               | 36,342               | 3,211                | 3,709                | 7,495                | 123,296    |
| Large Chinook Salmon Harvested |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 96                   | 1,149                | 661                  | 35                   | 109                  | 0                    | 2,051      |
| Variance                       | 1,088                | 115,152              | 19,560               | 235                  | 2,692                | 0                    | 138,727    |
| Large Chinook Salmon Released  |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 0                    | 37                   | 15                   | 0                    | 0                    | 0                    | 52         |
| Variance                       | 0                    | 228                  | 99                   | 0                    | 0                    | 0                    | 327        |
| Small Chinook Salmon Released  |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 8                    | 76                   | 71                   | 24                   | 59                   | 0                    | 238        |
| Variance                       | 50                   | 1,617                | 730                  | 343                  | 1,081                | 0                    | 3,820      |
| Coho Salmon Released           |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 0                    | 0                    | 0                    | 0                    | 0                    | 8                    | 8          |
| Variance                       | 0                    | 0                    | 0                    | 0                    | 0                    | 49                   | 49         |
| Pink Salmon Harvested          |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 0                    | 0                    | 0                    | 0                    | 0                    | 48                   | 48         |
| Variance                       | 0                    | 0                    | 0                    | 0                    | 0                    | 1,559                | 1,559      |
| Pacific Halibut Harvested      |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 54                   | 77                   | 104                  | 117                  | 292                  | 249                  | 894        |
| Variance                       | 445                  | 808                  | 1,142                | 1,177                | 9,354                | 8,679                | 21,606     |
| Pacific Halibut Released       |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 0                    | 0                    | 0                    | 4                    | 0                    | 8                    | 12         |
| Variance                       | 0                    | 0                    | 0                    | 14                   | 0                    | 50                   | 65         |
| Lingcod Harvested              |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 0                    | 4                    | 0                    | 9                    | 4                    | 24                   | 41         |
| Variance                       | 0                    | 13                   | 0                    | 56                   | 15                   | 390                  | 475        |
| Lingcod Released               |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 0                    | 0                    | 4                    | 0                    | 0                    | 0                    | 4          |
| Variance                       | 0                    | 0                    | 11                   | 0                    | 0                    | 0                    | 11         |
| All Rockfish Harvested         |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 55                   | 29                   | 23                   | 7                    | 40                   | 0                    | 153        |
| Variance                       | 771                  | 461                  | 473                  | 36                   | 1,220                | 0                    | 2,962      |
| All Rockfish Released          |                      |                      |                      |                      |                      |                      |            |
| Estimate                       | 35                   | 0                    | 4                    | 0                    | 0                    | 0                    | 39         |
| Variance                       | 942                  | 0                    | 11                   | 0                    | 0                    | 0                    | 953        |

## Appendix C7.

Estimated finfish effort and catches for the Sitka  
marine boat sport fishery, 24 April - 02 July 1989.

|                               | APPROXIMATE<br>95% C.I. LOWER<br>LIMIT | ESTIMATE | APPROXIMATE<br>95% C.I. UPPER<br>LIMIT |
|-------------------------------|--|----------|--|
| Finfish Effort                |  |          |  |
| Boat-hours                    | 15,013                                 | 17,413   | 19,813                                 |
| Salmon-hours                  | 29,342                                 | 34,946   | 40,551                                 |
| Halibut-hours                 | 3,887                                  | 6,118    | 8,349                                  |
| Lingcod-hours                 | 2                                      | 13       | 37                                     |
| Rockfish-hours                | 6                                      | 46       | 132                                    |
| Bottomfish-hours              | 3,946                                  | 6,177    | 8,408                                  |
| Angler-hours                  | 35,178                                 | 41,362   | 47,546                                 |
| Boat-Days                     | 2,079                                  | 2,503    | 2,926                                  |
| Finfish Harvests <sup>a</sup> |  |          |  |
| Total Large Chinook Salmon    | 2,645                                  | 3,501    | 4,358                                  |
| Derby Take-home               | 241                                    | 403      | 565                                    |
| Derby Entered                 | ---                                    | 670      | ---                                    |
| Derby Take-home & Entered     | 911                                    | 1,073    | 1,235                                  |
| Coho Salmon                   | 7                                      | 104      | 238                                    |
| Sockeye Salmon                | 1                                      | 11       | 143                                    |
| Pink Salmon                   | 1                                      | 14       | 40                                     |
| Pacific Halibut               | 1,559                                  | 2,694    | 3,829                                  |
| Steelhead                     | 1                                      | 11       | 31                                     |
| Dolly Varden                  | 18                                     | 208      | 484                                    |
| Lingcod                       | 120                                    | 294      | 468                                    |
| Kelp Greenling                | 2                                      | 20       | 58                                     |
| Total Rockfish                | 318                                    | 683      | 1,048                                  |
| Black Rockfish                | 14                                     | 108      | 246                                    |
| Copper Rockfish               | 3                                      | 31       | 75                                     |
| Dusky Rockfish                | 31                                     | 89       | 147                                    |
| Quillback Rockfish            | 20                                     | 161      | 345                                    |
| Boccacio                      | 2                                      | 18       | 41                                     |
| Yelloweye Rockfish            | 4                                      | 35       | 70                                     |
| Other Rockfish                | 34                                     | 240      | 464                                    |
| Finfish Released <sup>b</sup> |  |          |  |
| Small Chinook Salmon          | 901                                    | 1,416    | 1,932                                  |
| Large Chinook Salmon          | 15                                     | 39       | 63                                     |
| Coho Salmon                   | 8                                      | 88       | 184                                    |
| Pink Salmon                   | 2                                      | 24       | 58                                     |
| Pacific Halibut               | 676                                    | 1,411    | 2,146                                  |
| Steelhead                     | 2                                      | 22       | 63                                     |
| Dolly Varden                  | 31                                     | 253      | 561                                    |
| Lingcod                       | 185                                    | 706      | 1,228                                  |
| Kelp Greenling                | 2                                      | 13       | 37                                     |
| Total Rockfish                | 3,355                                  | 4,459    | 5,562                                  |

<sup>a</sup> No small chinook salmon, chum salmon, cutthroat trout, or yellowtail rockfish harvested.

<sup>b</sup> No chum salmon, sockeye salmon, or cutthroat trout released.

## Appendix C8.

Estimated finfish effort and catches for the Sitka marine boat sport fishery by seasonal period, 24 April - 2 July 1989.

|                                | Seasonal Period      |                      |                      |                    |                      |                      | Total     |
|--------------------------------|----------------------|----------------------|----------------------|--------------------|----------------------|----------------------|-----------|
|                                | 24APR89 -<br>07MAY89 | 08MAY89 -<br>21MAY89 | 22MAY89 -<br>04JUN89 | Derby <sup>a</sup> | 05JUN89 -<br>18JUN89 | 19JUN89 -<br>02JUL89 |           |
| Number of Samples              | 20                   | 16                   | 10                   | 10                 | 20                   | 14                   | 90        |
| Number of Boats Counted        | 31                   | 38                   | 26                   | 198                | 71                   | 66                   | 430       |
| Number of Boats Interviewed    | 31                   | 38                   | 26                   | 198                | 71                   | 66                   | 430       |
| Hours Sampled                  | 71                   | 57                   | 35                   | 36                 | 71                   | 50                   | 319       |
| Hours Available to Sample      | 609                  | 641                  | 425                  | 245                | 672                  | 672                  | 3,263     |
| Boat-hours Fished              |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 561                  | 1,217                | 946                  | 9,117              | 2,503                | 3,068                | 17,413    |
| Variance                       | 25,113               | 84,859               | 160,670              | 843,155            | 191,218              | 134,965              | 1,439,980 |
| Salmon-hours Fished            |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 308                  | 2,155                | 1,547                | 21,675             | 3,557                | 5,704                | 34,946    |
| Variance                       | 19,846               | 421,047              | 478,917              | 5,995,640          | 408,151              | 529,768              | 7,853,369 |
| Halibut-hours Fished           |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 520                  | 690                  | 932                  | 735                | 2,092                | 1,149                | 6,118     |
| Variance                       | 43,937               | 63,525               | 251,447              | 308,353            | 430,642              | 146,287              | 1,244,191 |
| Lingcod-hours Fished           |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 0                    | 13                   | 0                    | 0                  | 0                    | 0                    | 13        |
| Variance                       | 0                    | 141                  | 0                    | 0                  | 0                    | 0                    | 141       |
| Rockfish-hours Fished          |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 46                   | 0                    | 0                    | 0                  | 0                    | 0                    | 46        |
| Variance                       | 1,862                | 0                    | 0                    | 0                  | 0                    | 0                    | 1,862     |
| Bottomfish-hours Fished        |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 566                  | 702                  | 932                  | 735                | 2,092                | 1,149                | 6,177     |
| Variance                       | 43,803               | 64,162               | 251,447              | 308,353            | 430,642              | 146,287              | 1,244,693 |
| Angler-hours Fished            |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 1,073                | 2,883                | 2,479                | 22,410             | 5,650                | 6,867                | 41,362    |
| Variance                       | 97,805               | 620,122              | 1,332,165            | 5,505,775          | 1,187,687            | 815,725              | 9,559,279 |
| Boat-days Fished               |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 243                  | 346                  | 321                  | ---                | 654                  | 939                  | 2,503     |
| Variance                       | 3,050                | 6,700                | 15,097               | ---                | 13,788               | 6,215                | 44,851    |
| Large Chinook Salmon Harvested |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 0                    | 226                  | 151                  | 1,073              | 807                  | 1,245                | 3,501     |
| Variance                       | 0                    | 18,304               | 9,025                | 6,567              | 52,364               | 97,265               | 183,523   |
| Large Chinook Salmon Released  |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 39                 | 0                    | 0                    | 39        |
| Variance                       | 0                    | 0                    | 0                    | 149                | 0                    | 0                    | 149       |
| Small Chinook Salmon Released  |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 6                    | 83                   | 100                  | 668                | 173                  | 387                  | 1,416     |
| Variance                       | 32                   | 4,281                | 7,082                | 42,367             | 6,312                | 6,318                | 66,391    |
| Coho Salmon Harvested          |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                  | 0                    | 104                  | 104       |
| Variance                       | 0                    | 0                    | 0                    | 0                  | 0                    | 4,490                | 4,490     |
| Coho Salmon Released           |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 7                  | 13                   | 67                   | 88        |
| Variance                       | 0                    | 0                    | 0                    | 16                 | 156                  | 2,136                | 2,308     |
| Sockeye Salmon Harvested       |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                  | 0                    | 11                   | 11        |
| Variance                       | 0                    | 0                    | 0                    | 0                  | 0                    | 120                  | 120       |
| Pink Salmon Harvested          |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                  | 0                    | 14                   | 14        |
| Variance                       | 0                    | 0                    | 0                    | 0                  | 0                    | 174                  | 174       |
| Pink Salmon Released           |                      |                      |                      |                    |                      |                      |           |
| Estimate                       | 0                    | 0                    | 0                    | 0                  | 7                    | 17                   | 24        |
| Variance                       | 0                    | 0                    | 0                    | 0                  | 39                   | 258                  | 297       |

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Appendix C8. (page 2 of 2)

|                              | Seasonal Period      |                      |                      |                    |                      |                      | Total   |
|------------------------------|----------------------|----------------------|----------------------|--------------------|----------------------|----------------------|---------|
|                              | 24APR89 -<br>07MAY89 | 08MAY89 -<br>21MAY89 | 22MAY89 -<br>04JUN89 | Derby <sup>a</sup> | 05JUN89 -<br>18JUN89 | 19JUN89 -<br>02JUL89 |         |
| Pacific Halibut Harvested    |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 31                   | 113                  | 230                  | 382                | 1,037                | 901                  | 2,694   |
| Variance                     | 290                  | 4,483                | 34,363               | 34,940             | 90,117               | 157,940              | 322,133 |
| Pacific Halibut Released     |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 6                    | 6                    | 150                  | 173                | 619                  | 458                  | 1,411   |
| Variance                     | 32                   | 34                   | 9,524                | 29,238             | 45,469               | 50,786               | 135,083 |
| Steelhead Harvested          |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 11                   | 0                    | 0                  | 0                    | 0                    | 11      |
| Variance                     | 0                    | 106                  | 0                    | 0                  | 0                    | 0                    | 106     |
| Steelhead Released           |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 22                   | 0                    | 0                  | 0                    | 0                    | 22      |
| Variance                     | 0                    | 422                  | 0                    | 0                  | 0                    | 0                    | 422     |
| Dolly Varden Harvested       |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 7                    | 0                    | 16                 | 15                   | 171                  | 208     |
| Variance                     | 0                    | 34                   | 0                    | 368                | 103                  | 18,518               | 19,024  |
| Dolly Varden Released        |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 169                  | 0                    | 0                    | 11                 | 0                    | 73                   | 253     |
| Variance                     | 20,313               | 0                    | 0                    | 98                 | 0                    | 3,275                | 23,685  |
| Lingcod Harvested            |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 13                   | 20                   | 151                | 59                   | 51                   | 294     |
| Variance                     | 0                    | 45                   | 361                  | 5,562              | 1,140                | 482                  | 7,590   |
| Lingcod Released             |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 67                   | 6                    | 0                    | 496                | 7                    | 130                  | 706     |
| Variance                     | 3,817                | 35                   | 0                    | 54,490             | 37                   | 9,574                | 67,953  |
| Kelp Greenling Harvested     |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 0                    | 20                   | 0                  | 0                    | 0                    | 20      |
| Variance                     | 0                    | 0                    | 361                  | 0                  | 0                    | 0                    | 361     |
| Kelp Greenling Released      |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 13                   | 0                    | 0                  | 0                    | 0                    | 13      |
| Variance                     | 0                    | 145                  | 0                    | 0                  | 0                    | 0                    | 145     |
| Black Rockfish Harvested     |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 8                    | 0                    | 70                   | 22                 | 8                    | 0                    | 108     |
| Variance                     | 52                   | 0                    | 4,420                | 241                | 64                   | 0                    | 4,777   |
| Boccacio Harvested           |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 11                   | 0                    | 0                  | 7                    | 0                    | 18      |
| Variance                     | 0                    | 106                  | 0                    | 0                  | 37                   | 0                    | 143     |
| Copper Rockfish Harvested    |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 0                    | 20                   | 0                  | 0                    | 11                   | 31      |
| Variance                     | 0                    | 0                    | 361                  | 0                  | 0                    | 114                  | 474     |
| Dusky Rockfish Harvested     |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 20                   | 0                    | 23                 | 35                   | 11                   | 89      |
| Variance                     | 0                    | 310                  | 0                    | 238                | 167                  | 114                  | 829     |
| Quillback Rockfish Harvested |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 125                  | 0                    | 7                  | 29                   | 0                    | 161     |
| Variance                     | 0                    | 8,001                | 0                    | 33                 | 416                  | 0                    | 8,451   |
| Yelloweye Rockfish Harvested |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 17                   | 0                    | 0                  | 7                    | 11                   | 35      |
| Variance                     | 0                    | 141                  | 0                    | 0                  | 39                   | 120                  | 300     |
| Other Rockfish Harvested     |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 0                    | 75                   | 0                    | 145                | 20                   | 0                    | 240     |
| Variance                     | 0                    | 5,176                | 0                    | 7,070              | 194                  | 0                    | 12,439  |
| All Rockfish Harvested       |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 8                    | 248                  | 90                   | 197                | 106                  | 34                   | 683     |
| Variance                     | 52                   | 15,695               | 7,307                | 7,582              | 2,215                | 484                  | 33,335  |
| All Rockfish Released        |                      |                      |                      |                    |                      |                      |         |
| Estimate                     | 52                   | 286                  | 310                  | 2,425              | 454                  | 932                  | 4,459   |
| Variance                     | 1,304                | 10,454               | 18,299               | 220,153            | 8,355                | 45,711               | 304,276 |

<sup>a</sup> Derby held on weekends of 27-29 May and 3-4 June 1989.

Appendix C9. Estimated finfish effort and catches for the Juneau marine boat sport fishery, 24 April - 24 September 1989.

|                                     | APPROXIMATE<br>95% C.I. LOWER<br>LIMIT | ESTIMATE | APPROXIMATE<br>95% C.I. UPPER<br>LIMIT |
|-------------------------------------|--|----------|--|
| <b>Finfish Effort<sup>a</sup></b>   |  |          |  |
| Boat-hours                          | 132,829                                | 145,237  | 157,645                                |
| Salmon-hours                        | 257,328                                | 287,676  | 318,024                                |
| Halibut-hours                       | 76,545                                 | 85,354   | 94,163                                 |
| Angler-hours                        | 340,268                                | 373,504  | 406,740                                |
| Boat-Days                           | 28,954                                 | 31,040   | 33,125                                 |
| <b>Finfish Harvests<sup>b</sup></b> |  |          |  |
| Total Large Chinook Salmon          | 5,938                                  | 6,902    | 7,867                                  |
| Derby Take-home                     | 33                                     | 197      | 608                                    |
| Derby Entered                       | ---                                    | 412      | ---                                    |
| Derby Take-home & Entered           | 445                                    | 609      | 1,020                                  |
| Total Small Chinook Salmon          | 77                                     | 17       | 267                                    |
| Derby Take-home & Entered           | 0                                      | 0        | 0                                      |
| Total Coho Salmon                   | 21,076                                 | 23,819   | 26,563                                 |
| Derby Take-home                     | 541                                    | 1,007    | 1,472                                  |
| Derby Entered                       | ---                                    | 2,166    | ---                                    |
| Derby Take-home & Entered           | 2,707                                  | 3,173    | 3,638                                  |
| Total Chum Salmon                   | 337                                    | 481      | 625                                    |
| Derby Take-home                     | 2                                      | 12       | 30                                     |
| Derby Entered                       | ---                                    | 23       | ---                                    |
| Derby Take-home & Entered           | 25                                     | 35       | 53                                     |
| Total Sockeye Salmon                | 33                                     | 192      | 455                                    |
| Derby Take-home                     | 3                                      | 18       | 46                                     |
| Derby Entered                       | ---                                    | 16       | ---                                    |
| Derby Take-home & Entered           | 19                                     | 34       | 62                                     |
| Total Pink Salmon                   | 6,945                                  | 8,414    | 9,882                                  |
| Derby Take-home                     | 396                                    | 1,126    | 1,855                                  |
| Derby Entered                       | ---                                    | 0        | ---                                    |
| Derby Take-home & Entered           | 396                                    | 1,126    | 1,855                                  |
| Pacific Halibut                     | 10,813                                 | 12,484   | 14,155                                 |
| Dolly Varden                        | 878                                    | 1,367    | 1,856                                  |
| Lingcod                             | 4                                      | 17       | 46                                     |
| Rockfish                            | 1,085                                  | 1,375    | 1,665                                  |
| <b>Finfish Released<sup>c</sup></b> |  |          |  |
| Small Chinook Salmon                | 4,150                                  | 5,557    | 6,964                                  |
| Large Chinook Salmon                | 38                                     | 134      | 230                                    |
| Coho Salmon                         | 435                                    | 693      | 951                                    |
| Chum Salmon                         | 10                                     | 54       | 97                                     |
| Pink Salmon                         | 1,043                                  | 1,594    | 2,146                                  |
| Pacific Halibut                     | 1,711                                  | 2,406    | 3,101                                  |
| Dolly Varden                        | 88                                     | 238      | 388                                    |
| Rockfish                            | 8                                      | 36       | 74                                     |

<sup>a</sup> No lingcod-hours or rockfish-hours reported.

<sup>b</sup> No steelhead, cutthroat trout, or kelp greenling harvested.

<sup>c</sup> No sockeye salmon, steelhead, cutthroat trout, lingcod, or kelp greenling released.

## Appendix C10.

Estimated finfish effort and catches for the Juneau marine boat recreational fishery by seasonal period, 24 April - 24 September 1989.

|                                   | Seasonal Period      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      | Total       |
|-----------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|----------------------|----------------------|----------------------|-------------|
|                                   | 24APR89 -<br>07MAY89 | 08MAY89 -<br>21MAY89 | 22MAY89 -<br>04JUN89 | 05JUN89 -<br>18JUN89 | 19JUN89 -<br>02JUL89 | 03JUL89 -<br>16JUL89 | 17JUL89 -<br>30JUL89 | 31JUL89 -<br>13AUG89 | Derby <sup>a</sup> | 14AUG89 -<br>27AUG89 | 28AUG89 -<br>10SEP89 | 11SEP89 -<br>24SEP89 |             |
| Number of Samples                 | 55                   | 56                   | 60                   | 60                   | 60                   | 60                   | 59                   | 36                   | 11                 | 60                   | 55                   | 60                   | 632         |
| Number of Boats Counted           | 126                  | 236                  | 430                  | 268                  | 413                  | 553                  | 502                  | 278                  | 476                | 731                  | 404                  | 153                  | 4,570       |
| Number of Boats<br>Interviewed    | 126                  | 236                  | 430                  | 268                  | 413                  | 552                  | 501                  | 277                  | 475                | 731                  | 403                  | 153                  | 4,565       |
| Hours Sampled                     | 184                  | 189                  | 201                  | 202                  | 203                  | 205                  | 200                  | 120                  | 83                 | 203                  | 179                  | 181                  | 2,151       |
| Hours Available to<br>Sample      | 2,030                | 2,242                | 2,315                | 2,389                | 2,426                | 2,352                | 2,279                | 1,696                | 528                | 2,095                | 1,985                | 1,874                | 24,209      |
| Boat-hours Fished                 | 3,991                | 6,972                | 14,807               | 8,779                | 12,065               | 17,263               | 15,165               | 10,190               | 23,347             | 19,354               | 10,413               | 2,893                | 145,237     |
| Estimate                          | 446,991              | 1,275,535            | 2,553,150            | 912,862              | 869,274              | 1,650,143            | 2,210,182            | 1,295,688            | 20,905,799         | 4,757,950            | 1,419,448            | 192,242              | 38,489,263  |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Salmon-hours Fished               | 7,606                | 15,143               | 29,611               | 15,773               | 16,582               | 26,839               | 27,938               | 19,976               | 64,413             | 39,026               | 19,133               | 5,638                | 287,676     |
| Estimate                          | 1,859,304            | 6,703,359            | 10,712,195           | 4,252,955            | 2,981,409            | 5,674,802            | 5,064,164            | 5,677,598            | 161,439,694        | 20,392,595           | 4,467,575            | 1,021,670            | 230,247,320 |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Halibut-hours Fished              | 941                  | 671                  | 3,774                | 5,082                | 15,517               | 19,913               | 13,402               | 6,768                | 1,730              | 10,013               | 6,283                | 1,259                | 85,354      |
| Estimate                          | 131,407              | 77,719               | 620,176              | 358,252              | 3,022,510            | 7,510,181            | 3,511,661            | 1,005,203            | 658,202            | 1,607,271            | 855,727              | 40,957               | 19,399,268  |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Angler-hours Fished               | 8,594                | 15,868               | 33,520               | 20,854               | 32,201               | 46,832               | 41,391               | 26,745               | 66,143             | 49,044               | 25,415               | 6,897                | 373,504     |
| Estimate                          | 2,033,995            | 7,014,156            | 12,972,081           | 4,754,588            | 6,435,171            | 13,186,487           | 13,797,752           | 7,692,617            | 168,850,234        | 30,523,638           | 7,783,849            | 1,114,477            | 276,159,044 |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Boat-days Fished                  | 1,033                | 1,822                | 3,406                | 2,392                | 3,205                | 4,553                | 3,866                | 2,684                | ---                | 4,839                | 2,419                | 821                  | 31,040      |
| Estimate                          | 20,275               | 84,202               | 109,079              | 63,293               | 60,435               | 98,288               | 165,395              | 76,374               | ---                | 337,691              | 49,409               | 22,708               | 1,087,149   |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Large Chinook Salmon<br>Harvested | 185                  | 481                  | 1,096                | 491                  | 434                  | 897                  | 1,006                | 396                  | 609                | 553                  | 484                  | 272                  | 6,902       |
| Estimate                          | 4,396                | 17,790               | 62,239               | 28,937               | 10,633               | 24,813               | 19,506               | 6,788                | 42,267             | 5,889                | 4,515                | 4,789                | 232,561     |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Large Chinook Salmon<br>Released  | 0                    | 0                    | 0                    | 0                    | 24                   | 13                   | 8                    | 0                    | 24                 | 15                   | 4                    | 46                   | 134         |
| Estimate                          | 0                    | 0                    | 0                    | 0                    | 479                  | 63                   | 24                   | 0                    | 408                | 193                  | 11                   | 1,124                | 2,302       |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Small Chinook Salmon<br>Harvested | 0                    | 0                    | 21                   | 0                    | 10                   | 35                   | 51                   | 0                    | 0                  | 35                   | 4                    | 16                   | 172         |
| Estimate                          | 0                    | 0                    | 164                  | 0                    | 43                   | 279                  | 987                  | 0                    | 0                  | 718                  | 11                   | 66                   | 2,267       |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Small Chinook Salmon<br>Released  | 42                   | 42                   | 287                  | 523                  | 195                  | 782                  | 969                  | 625                  | 1,215              | 497                  | 270                  | 111                  | 5,557       |
| Estimate                          | 469                  | 368                  | 10,619               | 110,589              | 5,187                | 40,816               | 42,098               | 27,116               | 243,706            | 6,575                | 5,350                | 2,174                | 495,068     |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Coho Salmon Harvested             | 0                    | 0                    | 0                    | 10                   | 84                   | 855                  | 2,411                | 3,146                | 3,173              | 9,994                | 3,367                | 779                  | 23,819      |
| Estimate                          | 0                    | 0                    | 0                    | 49                   | 618                  | 19,273               | 47,112               | 247,448              | 54,182             | 1,303,629            | 179,766              | 29,185               | 1,881,262   |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Coho Salmon Released              | 0                    | 0                    | 0                    | 0                    | 4                    | 0                    | 40                   | 43                   | 42                 | 367                  | 160                  | 37                   | 693         |
| Estimate                          | 0                    | 0                    | 0                    | 0                    | 13                   | 0                    | 699                  | 612                  | 336                | 8,579                | 5,932                | 443                  | 16,614      |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Chum Salmon Harvested             | 0                    | 0                    | 0                    | 0                    | 52                   | 85                   | 22                   | 39                   | 35                 | 106                  | 122                  | 21                   | 481         |
| Estimate                          | 0                    | 0                    | 0                    | 0                    | 1,446                | 679                  | 100                  | 637                  | 78                 | 897                  | 1,221                | 137                  | 5,194       |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Chum Salmon Released              | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 4                    | 9                    | 30                 | 0                    | 8                    | 4                    | 54          |
| Estimate                          | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 13                   | 64                   | 336                | 0                    | 43                   | 9                    | 466         |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Sockeye Salmon<br>Harvested       | 0                    | 0                    | 0                    | 1                    | 4                    | 133                  | 4                    | 0                    | 36                 | 15                   | 0                    | 0                    | 194         |
| Estimate                          | 0                    | 0                    | 0                    | 0                    | 13                   | 16,995               | 13                   | 0                    | 191                | 103                  | 0                    | 0                    | 17,316      |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Pink Salmon Harvested             | 0                    | 0                    | 0                    | 16                   | 165                  | 2,868                | 2,643                | 889                  | 1,126              | 667                  | 41                   | 0                    | 8,414       |
| Estimate                          | 0                    | 0                    | 0                    | 248                  | 1,543                | 289,662              | 78,623               | 23,409               | 133,117            | 12,439               | 282                  | 0                    | 539,324     |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |
| Pink Salmon Released              | 0                    | 0                    | 0                    | 0                    | 114                  | 111                  | 360                  | 131                  | 625                | 239                  | 13                   | 0                    | 1,594       |
| Estimate                          | 0                    | 0                    | 0                    | 0                    | 6,007                | 1,094                | 22,118               | 3,005                | 38,643             | 5,063                | 68                   | 0                    | 75,998      |
| Variance                          |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |             |

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Appendix C10. (page 2 of 2)

|                           | Seasonal Period      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      | Total   |
|---------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|----------------------|----------------------|----------------------|---------|
|                           | 24APR89 -<br>07MAY89 | 08MAY89 -<br>21MAY89 | 22MAY89 -<br>04JUN89 | 05JUN89 -<br>18JUN89 | 19JUN89 -<br>02JUL89 | 03JUL89 -<br>16JUL89 | 17JUL89 -<br>30JUL89 | 31JUL89 -<br>13AUG89 | Derby <sup>a</sup> | 14AUG89 -<br>27AUG89 | 28AUG89 -<br>10SEP89 | 11SEP89 -<br>24SEP89 |         |
| Pacific Halibut Harvested |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |         |
| Estimate                  | 19                   | 53                   | 414                  | 496                  | 2,407                | 3,157                | 2,121                | 816                  | 560                | 1,514                | 795                  | 131                  | 12,484  |
| Variance                  | 187                  | 558                  | 16,303               | 5,974                | 137,994              | 281,288              | 161,417              | 17,700               | 22,690             | 27,802               | 24,289               | 1,737                | 697,939 |
| Pacific Halibut Released  |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |         |
| Estimate                  | 5                    | 36                   | 43                   | 202                  | 606                  | 363                  | 391                  | 304                  | 185                | 234                  | 38                   | 0                    | 2,406   |
| Variance                  | 16                   | 601                  | 868                  | 6,092                | 48,087               | 6,511                | 24,969               | 20,690               | 8,030              | 4,733                | 182                  | 0                    | 120,778 |
| Dolly Varden Harvested    |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |         |
| Estimate                  | 145                  | 49                   | 278                  | 318                  | 198                  | 151                  | 83                   | 59                   | 36                 | 18                   | 0                    | 31                   | 1,367   |
| Variance                  | 14,057               | 523                  | 4,491                | 30,080               | 2,418                | 1,481                | 3,608                | 1,837                | 242                | 75                   | 0                    | 894                  | 59,705  |
| Dolly Varden Released     |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |         |
| Estimate                  | 35                   | 9                    | 76                   | 94                   | 0                    | 6                    | 6                    | 0                    | 12                 | 0                    | 0                    | 0                    | 238     |
| Variance                  | 1,071                | 62                   | 1,260                | 3,097                | 0                    | 33                   | 26                   | 0                    | 81                 | 0                    | 0                    | 0                    | 5,630   |
| Lingcod Harvested         |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |         |
| Estimate                  | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 17                   | 0                    | 0                  | 0                    | 0                    | 0                    | 17      |
| Variance                  | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 209                  | 0                    | 0                  | 0                    | 0                    | 0                    | 209     |
| All Rockfish Harvested    |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |         |
| Estimate                  | 37                   | 9                    | 85                   | 77                   | 209                  | 159                  | 272                  | 166                  | 77                 | 130                  | 147                  | 7                    | 1,375   |
| Variance                  | 437                  | 63                   | 2,622                | 430                  | 4,517                | 2,708                | 4,046                | 2,094                | 679                | 625                  | 2,783                | 37                   | 21,042  |
| All Rockfish Released     |                      |                      |                      |                      |                      |                      |                      |                      |                    |                      |                      |                      |         |
| Estimate                  | 0                    | 18                   | 0                    | 0                    | 4                    | 3                    | 0                    | 0                    | 0                  | 10                   | 0                    | 0                    | 36      |
| Variance                  | 0                    | 249                  | 0                    | 0                    | 13                   | 9                    | 0                    | 0                    | 0                  | 86                   | 0                    | 0                    | 356     |

<sup>a</sup> Derby held on 4-6 August 1989.

Appendix C11.      Estimated finfish effort and catches for the Haines  
marine boat sport fishery, 24 April - 25 June 1989.

|                               | APPROXIMATE<br>95% C.I. LOWER<br>LIMIT | ESTIMATE | APPROXIMATE<br>95% C.I. UPPER<br>LIMIT |
|-------------------------------|--|----------|--|
| Finfish Effort <sup>a</sup>   |  |          |  |
| Boat-hours                    | 3,890                                  | 4,769    | 5,648                                  |
| Salmon-hours                  | 7,518                                  | 9,363    | 11,208                                 |
| Halibut-hours                 | 426                                    | 1,108    | 1,790                                  |
| Angler-hours                  | 8,528                                  | 10,526   | 12,524                                 |
| Boat-Days                     | 1,035                                  | 1,235    | 1,436                                  |
| Finfish Harvests <sup>b</sup> |  |          |  |
| Large Chinook Salmon          | 150                                    | 235      | 320                                    |
| Small Chinook Salmon          | 1                                      | 17       | 48                                     |
| Pacific Halibut               | 15                                     | 116      | 261                                    |
| Dolly Varden                  | 18                                     | 65       | 112                                    |
| Finfish Released <sup>c</sup> |  |          |  |
| Small Chinook Salmon          | 233                                    | 420      | 607                                    |
| Large Chinook Salmon          | 1                                      | 2        | 5                                      |
| Pacific Halibut               | 2                                      | 8        | 21                                     |
| Dolly Varden                  | 12                                     | 38       | 64                                     |
| Rockfish                      | 5                                      | 80       | 229                                    |

<sup>a</sup> No lingcod-hours or rockfish-hours reported.

<sup>b</sup> No coho salmon, chum salmon, sockeye salmon, pink salmon, steelhead, cutthroat trout, lingcod, kelp greenling, or rockfish harvested.

<sup>c</sup> No coho salmon, chum salmon, sockeye salmon, pink salmon, steelhead, cutthroat trout, lingcod, or kelp greenling released.

Appendix C12. Estimated finfish effort and catches for the Haines marine boat sport fishery by seasonal period, 24 April - 25 June 1989.

|                             | Seasonal Period      |                      |                      |                      |                      |                      |                      |                      |                      | Total   |
|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------|
|                             | 24APR89 -<br>30APR89 | 01MAY89 -<br>07MAY89 | 08MAY89 -<br>14MAY89 | 15MAY89 -<br>21MAY89 | 22MAY89 -<br>28MAY89 | 29MAY89 -<br>04JUN89 | 05JUN89 -<br>11JUN89 | 12JUN89 -<br>18JUN89 | 19JUN89 -<br>25JUN89 |         |
| Number of Samples           | 12                   | 12                   | 12                   | 12                   | 12                   | 12                   | 12                   | 12                   | 13                   | 109     |
| Number of Boats Counted     | 24                   | 8                    | 13                   | 47                   | 46                   | 44                   | 63                   | 33                   | 6                    | 284     |
| Number of Boats Interviewed | 24                   | 8                    | 13                   | 46                   | 46                   | 44                   | 63                   | 32                   | 6                    | 282     |
| Hours Sampled               | 43                   | 44                   | 43                   | 44                   | 43                   | 43                   | 43                   | 44                   | 47                   | 393     |
| Hours Available to Sample   | 203                  | 210                  | 326                  | 326                  | 336                  | 347                  | 347                  | 347                  | 347                  | 2,786   |
| Boat-hours Fished           |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 295                  | 128                  | 130                  | 431                  | 812                  | 566                  | 1,422                | 763                  | 220                  | 4,769   |
| Variance                    | 6,503                | 1,768                | 6,216                | 17,764               | 48,017               | 1,400                | 82,508               | 10,257               | 18,748               | 193,181 |
| Salmon-hours Fished         |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 598                  | 180                  | 213                  | 972                  | 1,715                | 1,345                | 3,311                | 846                  | 182                  | 9,363   |
| Variance                    | 32,940               | 6,132                | 18,193               | 64,391               | 283,185              | 10,127               | 383,138              | 30,708               | 22,440               | 851,254 |
| Halibut-hours Fished        |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 30                   | 33                   | 19                   | 0                    | 32                   | 0                    | 27                   | 605                  | 361                  | 1,108   |
| Variance                    | 771                  | 783                  | 101                  | 0                    | 960                  | 0                    | 447                  | 41,932               | 71,361               | 116,356 |
| Angler-hours Fished         |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 628                  | 213                  | 232                  | 972                  | 1,747                | 1,345                | 3,338                | 1,499                | 551                  | 10,526  |
| Variance                    | 41,912               | 6,810                | 18,032               | 64,391               | 286,065              | 10,127               | 392,786              | 59,319               | 118,630              | 998,071 |
| Boat-days Fished            |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 100                  | 37                   | 50                   | 104                  | 234                  | 170                  | 324                  | 184                  | 33                   | 1,235   |
| Variance                    | 655                  | 143                  | 727                  | 688                  | 3,572                | 370                  | 3,188                | 331                  | 403                  | 10,077  |
| Large Chinook Harvested     |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 0                    | 0                    | 5                    | 20                   | 64                   | 33                   | 75                   | 35                   | 2                    | 235     |
| Variance                    | 0                    | 0                    | 25                   | 66                   | 304                  | 97                   | 996                  | 307                  | 3                    | 1,797   |
| Large Chinook Released      |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 0                    | 0                    | 0                    | 2                    | 0                    | 0                    | 0                    | 0                    | 0                    | 2       |
| Variance                    | 0                    | 0                    | 0                    | 3                    | 0                    | 0                    | 0                    | 0                    | 0                    | 3       |
| Small Chinook Harvested     |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 17                   | 0                    | 0                    | 17      |
| Variance                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 256                  | 0                    | 0                    | 256     |
| Small Chinook Released      |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 0                    | 0                    | 0                    | 9                    | 157                  | 51                   | 154                  | 49                   | 0                    | 420     |
| Variance                    | 0                    | 0                    | 0                    | 12                   | 1,553                | 259                  | 5,670                | 1,269                | 0                    | 8,763   |
| Pacific Halibut Harvested   |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 0                    | 0                    | 2                    | 0                    | 0                    | 0                    | 0                    | 80                   | 35                   | 116     |
| Variance                    | 0                    | 0                    | 2                    | 0                    | 0                    | 0                    | 0                    | 4,295                | 903                  | 5,200   |
| Pacific Halibut Released    |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 8                    | 8       |
| Variance                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 45                   | 45      |
| Dolly Varden Harvested      |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 0                    | 0                    | 0                    | 11                   | 12                   | 0                    | 10                   | 16                   | 15                   | 65      |
| Variance                    | 0                    | 0                    | 0                    | 23                   | 63                   | 0                    | 35                   | 255                  | 178                  | 554     |
| Dolly Varden Released       |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 0                    | 0                    | 0                    | 0                    | 22                   | 7                    | 5                    | 5                    | 0                    | 38      |
| Variance                    | 0                    | 0                    | 0                    | 0                    | 126                  | 15                   | 12                   | 12                   | 0                    | 167     |
| All Rockfish Released       |                      |                      |                      |                      |                      |                      |                      |                      |                      |         |
| Estimate                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 80                   | 0                    | 80      |
| Variance                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 0                    | 5,544                | 0                    | 5,544   |

Appendix C13. Numbers of chinook salmon examined for coded-wire tags in southeast Alaska marine sport fisheries in 1989.

| Fishery     | Seasonal Period              | Large Chinook     |                |         | Small Chinook     |                |         |
|-------------|------------------------------|-------------------|----------------|---------|-------------------|----------------|---------|
|             |                              | Estimated Harvest | Number Sampled | Percent | Estimated Harvest | Number Sampled | Percent |
| Ketchikan   | Non-derby 4/24-6/18          | 1,518             | 116            | 8%      | 96                | 10             | 10%     |
|             | Derby Entered <sup>a</sup>   | 346               | 346            | 100%    | 0                 | 0              | ---     |
|             | Derby Take Home <sup>a</sup> | 474               | 60             | 13%     | 0                 | 0              | ---     |
|             | 6/19-7/30                    | 1,777             | 152            | 9%      | 93                | 3              | 32%     |
|             | 7/31-9/24                    | 1,380             | 174            | 13%     | 68                | 9              | 13%     |
|             | Total                        | 5,495             | 848            | 15%     | 257               | 22             | 9%      |
| Petersburg  | Non-derby 4/10-7/16          | 1,108             | 145            | 13%     | 10                | 2              | 20%     |
|             | Derby Entered <sup>b</sup>   | 295               | 273            | 93%     | 1                 | 1              | 100%    |
|             | Total                        | 1,403             | 418            | 30%     | 11                | 3              | 27%     |
| Wrangell    | 4/24-7/16                    | 2,051             | 293            | 14%     | 0                 | 0              | ---     |
| Sitka       | Non-derby 4/24-7/02          | 2,428             | 175            | 7%      | 0                 | 0              | ---     |
|             | Derby Entered <sup>c</sup>   | 670               | 670            | 100%    | 0                 | 0              | ---     |
|             | Derby Take Home <sup>c</sup> | 403               | 49             | 12%     | 0                 | 0              | ---     |
|             | Total                        | 3,501             | 894            | 26%     | 0                 | 0              | ---     |
| Juneau      | 4/24-6/18                    | 2,187             | 247            | 11%     | 21                | 3              | 14%     |
|             | 6/19-7/30                    | 2,075             | 280            | 13%     | 96                | 14             | 15%     |
|             | Non-derby 7/31-9/24          | 1,418             | 194            | 14%     | 55                | 8              | 15%     |
|             | Derby Entered <sup>d</sup>   | 412               | 388            | 94%     | 0                 | 0              | ---     |
|             | Derby Take Home <sup>d</sup> | 197               | 31             | 16%     | 0                 | 0              | ---     |
|             | Shelter Lodge                | 613               | 0              | 0%      | 0                 | 0              | ---     |
|             | Total                        | 6,902             | 1,140          | 17%     | 172               | 25             | 15%     |
| Haines      | 4/24-6/25                    | 235               | 65             | 28%     | 17                | 1              | 6%      |
| Grand Total |                              | 19,587            | 3,658          | 19%     | 457               | 51             | 11%     |

<sup>a</sup> Derby held on weekends of 27-29 May, 3-4 June, and 10-11 June.

<sup>b</sup> Derby held on 26-29 May weekend.

<sup>c</sup> Derby held on weekends of 27-29 May and 3-4 June.

<sup>d</sup> Derby held on 4-6 August weekend.

Appendix C14. Estimates of hatchery produced chinook salmon contributed to the Ketchikan marine sport fishery from 24 April to 24 September 1989.

| Region            | Agency <sup>b</sup> | Hatchery/<br>Release<br>Site | Tag Code               | Non-derby 4/24-6/18 |                    |                               | Derby <sup>a</sup> |                    |                               | 6/19-7/30          |                    |                               | 7/31-9/24          |                    |                               | Total              |                    |                               |
|-------------------|---------------------|------------------------------|------------------------|---------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|
|                   |                     |                              |                        | Recov <sup>c</sup>  | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> |
| Oregon            | ODFW                | Bonneville                   | 07-38-23<br>07-47-21R1 | ---                 | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1<br>1             | 12<br>10           | 133<br>100                    | 1<br>1             | 12<br>10           | 133<br>100                    |
|                   |                     | Oregon Total                 |                        | ---                 | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 2                  | 22                 | 233                           | 2                  | 22                 | 233                           |
|                   | British<br>Columbia | CDFO                         | Capilano River         | 02-35-40            | ---                | ---                           | ---                | 1                  | 36                            | 1,261              | ---                | ---                           | ---                | ---                | ---                           | ---                | 1                  | 36                            |
| Kitimat River     |                     |                              | 02-32-54               | ---                 | ---                | ---                           | 1                  | 2                  | 2                             | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 2                  | 2                             |
|                   |                     |                              | 02-32-56               | 1                   | 63                 | 3,979                         | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 63                 | 3,979                         |
|                   |                     |                              | 02-36-28               | ---                 | ---                | ---                           | 1                  | 69                 | 4,818                         | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 69                 | 4,818                         |
|                   |                     |                              | 02-36-29               | 1                   | 118                | 13,728                        | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 118                | 13,728                        |
|                   |                     |                              | 02-36-30               | 1                   | 101                | 10,227                        | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 101                | 10,227                        |
|                   |                     |                              | 02-36-31               | ---                 | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | 1                  | 11                            | 118                | 1                  | 11                            |
| Little Qualicum R |                     |                              | 02-40-36               | 1                   | 174                | 30,191                        | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 174                | 30,191                        |
| Quinsam River     |                     |                              | 02-33-24               | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 271                | 74,567                        | ---                | ---                | ---                           | 1                  | 271                | 74,567                        |
|                   |                     |                              | 02-35-54               | ---                 | ---                | ---                           | 1                  | 15                 | 200                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 15                 | 200                           |
|                   |                     |                              | 02-40-18               | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 16                 | 235                           | ---                | ---                | ---                           | 1                  | 16                 | 235                           |
| Terrace CDP       |                     |                              | 02-33-50               | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 12                 | 130                           | ---                | ---                | ---                           | 1                  | 12                 | 130                           |
| CDFR              |                     | Quinsam River                | 08-23-51               | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 1                  | 0                             |
|                   |                     |                              |                        | ---                 | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           |
|                   |                     | British Columbia Total       |                        |                     |                    | 4                             | 456                | 58,125             | 5                             | 123                | 6,281              | 3                             | 298                | 74,932             | 1                             | 11                 | 118                | 13                            |

-(Continued)-

Appendix C14. (page 2 of 2)

| Region                  | Agency <sup>b</sup> | Hatchery/<br>Release<br>Site | Tag Code   | Non-derby 4/24-6/18 |                    |                               | Derby <sup>a</sup> |                    |                               | 6/19-7/30          |                    |                               | 7/31-9/24          |                    |                               | Total              |                    |                               |
|-------------------------|---------------------|------------------------------|------------|---------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|
|                         |                     |                              |            | Recov <sup>c</sup>  | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> |
| Southeast<br>Alaska     | ADF&G               | Crystal Lake                 | 04-25-11   | ---                 | ---                | ---                           | 1                  | 5                  | 17                            | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 5                  | 17                            |
|                         |                     |                              | 04-25-34   | 1                   | 22                 | 542                           | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | 1                             | 22                 | 542                |                               |
|                         |                     | Deer Mountain                | 04-25-35   | ---                 | ---                | ---                           | 1                  | 6                  | 31                            | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 6                  | 31                            |
|                         |                     |                              | 04-25-36   | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 20                 | 396                           | ---                | ---                | ---                           | 1                  | 20                 | 396                           |
|                         |                     |                              | 04-25-37   | 1                   | 22                 | 450                           | 2                  | 2                  | 0                             | 1                  | 11                 | 107                           | ---                | ---                | ---                           | 4                  | 34                 | 557                           |
|                         |                     |                              | 04-25-38   | 1                   | 21                 | 447                           | ---                | ---                | ---                           | 3                  | 36                 | 416                           | ---                | ---                | ---                           | 4                  | 57                 | 863                           |
|                         | MIC                 | Tamgas Creek                 | 47-16-25   | 1                   | 87                 | 7,558                         | 1                  | 9                  | 74                            | ---                | ---                | ---                           | ---                | ---                | ---                           | 2                  | 96                 | 7,631                         |
|                         |                     |                              | 47-16-31   | ---                 | ---                | ---                           | 1                  | 9                  | 69                            | 1                  | 95                 | 8,952                         | ---                | ---                | ---                           | 2                  | 104                | 9,021                         |
|                         |                     |                              | 47-16-38   | ---                 | ---                | ---                           | 1                  | 23                 | 507                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 23                 | 507                           |
|                         | NMFS                | Little Port Walter           | 03-18-27   | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 1                  | 0                             |
|                         | SSRAA               | Carroll Inlet                | 04-26-26R4 | ---                 | ---                | ---                           | 2                  | 29                 | 393                           | 1                  | 140                | 19,741                        | ---                | ---                | ---                           | 3                  | 169                | 20,134                        |
|                         |                     |                              | 04-26-26R5 | ---                 | ---                | ---                           | 1                  | 15                 | 197                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 15                 | 197                           |
|                         |                     |                              | 04-28-25R1 | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 27                 | 731                           | ---                | ---                | ---                           | 1                  | 27                 | 731                           |
|                         |                     |                              | 04-28-25R2 | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 55                 | 3,066                         | ---                | ---                | ---                           | 1                  | 55                 | 3,066                         |
|                         |                     |                              | 04-31-07R4 | 1                   | 8                  | 120                           | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 8                  | 120                           |
|                         |                     | Neets Bay                    | 04-03-36   | 1                   | 223                | 49,564                        | ---                | ---                | ---                           | 1                  | 224                | 50,551                        | ---                | ---                | ---                           | 2                  | 447                | 100,115                       |
|                         |                     |                              | 04-03-42   | ---                 | ---                | ---                           | 1                  | 21                 | 419                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 21                 | 419                           |
|                         |                     |                              | 04-03-44   | 1                   | 167                | 27,611                        | ---                | ---                | ---                           | 1                  | 205                | 41,884                        | ---                | ---                | ---                           | 2                  | 371                | 69,495                        |
|                         |                     |                              | 04-03-45   | ---                 | ---                | ---                           | 1                  | 149                | 22,061                        | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 149                | 22,061                        |
|                         |                     | Whitman Lake                 | 04-03-29   | ---                 | ---                | ---                           | 1                  | 2                  | 3                             | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 2                  | 3                             |
|                         |                     |                              | 04-03-30   | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 24                 | 554                           | ---                | ---                | ---                           | 1                  | 24                 | 554                           |
|                         |                     |                              | 04-03-31   | ---                 | ---                | ---                           | 3                  | 7                  | 8                             | 1                  | 43                 | 1,897                         | ---                | ---                | ---                           | 4                  | 50                 | 1,905                         |
|                         |                     |                              | 04-03-32   | 1                   | 21                 | 438                           | 2                  | 4                  | 5                             | 1                  | 22                 | 449                           | ---                | ---                | ---                           | 4                  | 47                 | 893                           |
|                         |                     |                              | 04-03-33   | ---                 | ---                | ---                           | 1                  | 2                  | 3                             | 2                  | 48                 | 1,118                         | ---                | ---                | ---                           | 3                  | 50                 | 1,121                         |
|                         |                     |                              | 04-03-47   | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 15                 | 204                           | ---                | ---                | ---                           | 1                  | 15                 | 204                           |
|                         |                     |                              | 04-03-48   | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                  | 1                  | 0                             |
|                         |                     |                              | 04-03-49   | ---                 | ---                | ---                           | 3                  | 3                  | 0                             | ---                | ---                | ---                           | ---                | ---                | ---                           | 3                  | 3                  | 0                             |
|                         |                     |                              | 04-03-50   | 2                   | 32                 | 554                           | 2                  | 2                  | 0                             | 1                  | 12                 | 135                           | ---                | ---                | ---                           | 5                  | 46                 | 689                           |
|                         |                     |                              | 04-24-63   | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 11                 | 110                           | ---                | ---                | ---                           | 1                  | 11                 | 110                           |
|                         |                     |                              | 04-25-03   | 2                   | 59                 | 1,723                         | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | 2                  | 59                 | 1,723                         |
|                         | 04-26-31R2          | ---                          | ---        | ---                 | 2                  | 4                             | 4                  | ---                | ---                           | ---                | 2                  | 23                            | 261                | 4                  | 27                            | 266                |                    |                               |
|                         | 04-26-31R3          | ---                          | ---        | ---                 | 1                  | 2                             | 2                  | ---                | ---                           | ---                | 1                  | 11                            | 112                | 2                  | 13                            | 114                |                    |                               |
|                         | 04-26-31R5          | ---                          | ---        | ---                 | ---                | ---                           | ---                | 1                  | 20                            | 369                | 1                  | 11                            | 112                | 2                  | 31                            | 481                |                    |                               |
|                         | 04-31-08R1          | ---                          | ---        | ---                 | ---                | ---                           | ---                | ---                | 16                            | ---                | ---                | ---                           | ---                | 1                  | 16                            | ---                |                    |                               |
|                         | 04-31-08R2          | ---                          | ---        | ---                 | ---                | ---                           | ---                | ---                | ---                           | ---                | 1                  | 46                            | ---                | 1                  | 46                            | ---                |                    |                               |
|                         | 04-31-08R5          | 1                            | 8          | 120                 | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                | 1                  | 8                             | 120                |                    |                               |
| Southeast Alaska Total  |                     |                              |            | 13                  | 671                | 89,128                        | 29                 | 296                | 23,794                        | 21                 | 1,024              | 130,679                       | 5                  | 92                 | 485                           | 68                 | 2,082              | 244,086                       |
| All Regions Grand Total |                     |                              |            | 17                  | 1,127              | 147,253                       | 34                 | 418                | 30,075                        | 24                 | 1,322              | 205,611                       | 8                  | 125                | 837                           | 83                 | 2,992              | 383,775                       |

<sup>a</sup> Derby held on weekends of 27-29 May, 3-4 June, and 10-11 June.

<sup>b</sup> ODFW = Oregon Department of Fish and Wildlife CDFO = Canadian Department of Fisheries and Oceans

CDFR = Canadian Department of Fisheries Research ADF&G = Alaska Department of Fish and Game

MIC = Metlakatla Indian Community NMFS = National Marine Fisheries Service

SSRAA = Southern Southeast Regional Aquaculture Association

<sup>c</sup> Recov = Number of fish recovered of noted tag code.

<sup>d</sup> Contr = Estimated harvest of the release of the noted tag code.

<sup>e</sup> Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix C15. Estimates of hatchery produced chinook salmon contributed to the Petersburg marine sport fishery from 10 April to 16 July 1989.

| Region                  | Agency <sup>b</sup>    | Hatchery/<br>Release<br>Site | Tag Code | Non-derby 4/10-7/16              |                    |                               | Derby <sup>a</sup> |                    |                               | Total              |                    |                               |
|-------------------------|------------------------|------------------------------|----------|----------------------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|
|                         |                        |                              |          | Recov <sup>c</sup>               | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> |
| British<br>Columbia     | CDFO                   | Kitimat River                | 02-32-53 | ---                              | ---                | ---                           | 1                  | 33                 | 1,081                         | 1                  | 33                 | 1,081                         |
|                         |                        | Puntledge River              | 02-33-06 | ---                              | ---                | ---                           | 1                  | 3                  | 4                             | 1                  | 3                  | 4                             |
|                         | British Columbia Total |                              |          | ---                              | ---                | ---                           | 2                  | 36                 | 1,085                         | 2                  | 36                 | 1,085                         |
| Southeast<br>Alaska     | ADF&G                  | Crystal Lake                 | 04-23-21 | 1                                | 105                | 11,331                        | 1                  | 1                  | ---                           | 2                  | 106                | 11,331                        |
|                         |                        |                              | 04-23-56 | ---                              | ---                | ---                           | 1                  | 8                  | 49                            | 1                  | 8                  | 49                            |
|                         |                        |                              | 04-25-13 | ---                              | ---                | ---                           | 2                  | 10                 | 43                            | 2                  | 10                 | 43                            |
|                         |                        |                              | 04-25-30 | ---                              | ---                | ---                           | 2                  | 17                 | 135                           | 2                  | 17                 | 135                           |
|                         |                        |                              | 04-25-31 | 1                                | 40                 | 1,558                         | 1                  | 8                  | 55                            | 2                  | 48                 | 1,613                         |
|                         |                        |                              | 04-25-40 | 1                                | 48                 | 2,256                         | ---                | ---                | ---                           | 1                  | 48                 | 2,256                         |
|                         |                        |                              | 04-26-14 | ---                              | ---                | ---                           | 3                  | 10                 | 23                            | 3                  | 10                 | 23                            |
|                         |                        |                              | 04-26-15 | 1                                | 20                 | 372                           | ---                | ---                | ---                           | 1                  | 20                 | 372                           |
|                         |                        |                              | 04-29-60 | 1                                | 100                | ---                           | ---                | ---                | ---                           | 1                  | 100                | ---                           |
|                         |                        |                              | B4-00-10 | ---                              | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         |                        |                              | B4-00-11 | 1                                | 8                  | 67                            | ---                | ---                | ---                           | 1                  | 8                  | 67                            |
|                         |                        |                              | B4-12-12 | ---                              | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         |                        |                              | NMFS     | Snettisham<br>Little Port Walter | 04-26-07           | ---                           | ---                | ---                | 1                             | 1                  | 0                  | 1                             |
|                         | 03-19-02               | 1                            |          |                                  | 11                 | 104                           | 1                  | 1                  | 0                             | 2                  | 12                 | 104                           |
|                         | 03-19-14               | ---                          |          |                                  | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         | 03-19-21               | ---                          |          |                                  | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         | 03-19-23               | ---                          |          |                                  | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         | 03-19-31               | ---                          |          |                                  | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         | 03-21-04               | ---                          |          |                                  | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         | SSRAA                  | Whitman Lake                 | 04-03-32 | 1                                | 12                 | 132                           | ---                | ---                | ---                           | 1                  | 12                 | 132                           |
|                         |                        |                              | 04-03-46 | ---                              | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         |                        |                              | 04-03-47 | 1                                | 11                 | 141                           | ---                | ---                | ---                           | 1                  | 11                 | 141                           |
|                         | Southeast Alaska Total |                              |          | 9                                | 355                | 15,961                        | 20                 | 65                 | 305                           | 29                 | 420                | 16,266                        |
| All Regions Grand Total |                        |                              | 9        | 355                              | 15,961             | 22                            | 101                | 1,390              | 31                            | 456                | 17,351             |                               |

<sup>a</sup> Derby held on weekend of 26-29 May.

<sup>b</sup> CDFO = Canadian Department of Fisheries and Oceans  
NMFS = National Marine Fisheries Service

ADF&G = Alaska Department of Fish and Game

SSRAA = Southern Southeast Regional Aquaculture Association

<sup>c</sup> Recov = Number of fish recovered of noted tag code.

<sup>d</sup> Contr = Estimated harvest of the release of the noted tag code.

<sup>e</sup> Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix C16. Estimates of hatchery produced chinook salmon contributed to the Wrangell marine sport fishery from 24 April to 16 July 1989.

| Region                  | Agency <sup>a</sup> | Hatchery/<br>Release<br>Site | Tag Code | 24 April - 16 July |                    |                               | Total              |                    |                               |
|-------------------------|---------------------|------------------------------|----------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|
|                         |                     |                              |          | Recov <sup>b</sup> | Contr <sup>c</sup> | Var. of<br>Contr <sup>d</sup> | Recov <sup>b</sup> | Contr <sup>c</sup> | Var. of<br>Contr <sup>d</sup> |
| Oregon                  | ODFW                | Bonneville                   | 07-37-53 | 1                  | 12                 | 154                           | 1                  | 12                 | 154                           |
|                         |                     | Oregon Total                 |          | 1                  | 12                 | 154                           | 1                  | 12                 | 154                           |
| British<br>Columbia     | CDFO                | Kitimat River                | 02-32-54 | 1                  | 10                 | 100                           | 1                  | 10                 | 100                           |
|                         |                     | British Columbia Total       |          | 1                  | 10                 | 100                           | 1                  | 10                 | 100                           |
| Southeast<br>Alaska     | SSRAA               | Neets Bay                    | 04-03-36 | 1                  | 236                | 57,332                        | 1                  | 236                | 57,332                        |
|                         |                     | Southeast Alaska Total       |          | 1                  | 236                | 57,332                        | 1                  | 236                | 57,332                        |
| All Regions Grand Total |                     |                              |          | 3                  | 259                | 57,586                        | 3                  | 259                | 57,586                        |

<sup>a</sup> ODFW = Oregon Department of Fish and Wildlife  
 CDFO = Canadian Department of Fisheries and Oceans  
 SSRAA = Southern Southeast Regional Aquaculture Association

<sup>b</sup> Recov = Number of fish recovered of noted tag code.

<sup>c</sup> Contr = Estimated harvest of the release of the noted tag code.

<sup>d</sup> Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

## Appendix C17.

Estimates of wild tagged and hatchery produced chinook salmon contributed to the Sitka marine sport fishery from 24 April to 2 July 1989.

| Region                  | Agency <sup>b</sup>    | Hatchery/<br>Release<br>Site | Tag Code                         | Non-derby 4/24-7/02 |                    |                               | Derby <sup>a</sup> |                    |                               | Total              |                    |                               |
|-------------------------|------------------------|------------------------------|----------------------------------|---------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|
|                         |                        |                              |                                  | Recov <sup>c</sup>  | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> |
| Washington              | WDF                    | Lyons Ferry                  | 63-41-56R1                       | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         |                        | Priest Rapids                | 63-32-21                         | 1                   | 115                | 13,283                        | ---                | ---                | ---                           | 1                  | 115                | 13,283                        |
|                         |                        | Washougal                    | 63-34-07                         | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         |                        | Washington Total             |                                  | 1                   | 115                | 13,283                        | 2                  | 2                  | 0                             | 4                  | 118                | 13,283                        |
| British<br>Columbia     | CDFO                   | Conuma River                 | 02-32-25<br>02-37-23             | ---                 | ---                | ---                           | 1                  | 2                  | 1                             | 1                  | 2                  | 1                             |
|                         |                        |                              |                                  | 1                   | 45                 | 1,998                         | ---                | ---                | ---                           | 1                  | 45                 | 1,998                         |
|                         |                        | Kitimat River                | 02-32-53<br>02-32-54<br>02-32-56 | ---                 | ---                | ---                           | 1                  | 31                 | 923                           | 1                  | 31                 | 923                           |
|                         |                        |                              |                                  | ---                 | ---                | ---                           | 2                  | 2                  | 2                             | 1                  | 2                  | 2                             |
|                         |                        |                              |                                  | ---                 | ---                | ---                           | 2                  | 27                 | 569                           | 2                  | 27                 | 569                           |
|                         |                        | Marble River PIP             | 02-28-60                         | ---                 | ---                | ---                           | 1                  | 3                  | 5                             | 1                  | 3                  | 5                             |
|                         |                        | Nitinat River                | 02-32-30                         | ---                 | ---                | ---                           | 1                  | 20                 | 393                           | 1                  | 20                 | 393                           |
|                         |                        | Quinsam River                | 02-40-17                         | ---                 | ---                | ---                           | 1                  | 1                  | ---                           | 1                  | 1                  | ---                           |
|                         |                        | Robertson Creek              | 02-37-34<br>02-44-01             | ---                 | ---                | ---                           | 1                  | 326                | 105,882                       | 1                  | 326                | 105,882                       |
|                         |                        |                              |                                  | 1                   | 382                | 149,787                       | ---                | ---                | ---                           | 1                  | 382                | 149,787                       |
|                         |                        | Terrace CDP                  | 02-33-47<br>02-33-49<br>02-33-51 | 1                   | 13                 | 154                           | ---                | ---                | ---                           | 1                  | 13                 | 154                           |
|                         |                        |                              |                                  | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         |                        |                              |                                  | ---                 | ---                | ---                           | 1                  | 1                  | ---                           | 1                  | 1                  | ---                           |
|                         |                        | British Columbia Total       |                                  | 3                   | 440                | 151,939                       | 11                 | 414                | 107,776                       | 14                 | 853                | 259,715                       |
| Southeast<br>Alaska     | ADF&G                  | Crystal Lake                 | 04-26-14                         | ---                 | ---                | ---                           | 1                  | 3                  | 6                             | 1                  | 3                  | 6                             |
|                         |                        |                              |                                  | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         | NMFS                   | Little Port Walter           | 03-19-24<br>03-20-14             | ---                 | ---                | ---                           | 1                  | 1                  | ---                           | 1                  | 29                 | 832                           |
|                         |                        |                              |                                  | 1                   | 29                 | 832                           | ---                | ---                | ---                           | 1                  | 29                 | 832                           |
|                         | NSRAA                  | Medvejie CIF                 | 04-13-22<br>04-22-46<br>04-22-48 | 1                   | 177                | 31,192                        | ---                | ---                | ---                           | 1                  | 177                | 31,192                        |
|                         |                        |                              |                                  | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         |                        |                              |                                  | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         | SSRAA                  | Whitman Lake                 | 04-03-46<br>04-03-47             | ---                 | ---                | ---                           | 2                  | 2                  | 0                             | 2                  | 2                  | 0                             |
|                         |                        |                              |                                  | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                         | Southeast Alaska Total |                              | 2                                | 206                 | 32,024             | 7                             | 9                  | 7                  | 9                             | 215                | 32,031             |                               |
| All Regions Grand Total |                        |                              |                                  | 6                   | 761                | 197,246                       | 20                 | 425                | 107,783                       | 26                 | 1,186              | 305,028                       |
| Washington              | WDF                    | WILD (Lewis R.) <sup>f</sup> | 63-34-12                         | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |

<sup>a</sup> Derby held on weekends of 27-29 May and 3-4 June.

<sup>b</sup> WDF = Washington Department of Fisheries

ADF&G = Alaska Department of Fish and Game

NSRAA = Northern Southeast Regional Aquaculture Association

<sup>c</sup> Recov = Number of fish recovered of noted tag code.

<sup>d</sup> Contr = Estimated harvest of the release of the noted tag code.

<sup>e</sup> Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

<sup>f</sup> Contribution estimates for this tag code are not expanded by the tagging fraction as this is unknown for wild populations.

CDFO = Canadian Department of Fisheries and Oceans

NMFS = National Marine Fisheries Service

SSRAA = Southern Southeast Regional Aquaculture Association

Appendix C18. Estimates of hatchery produced chinook salmon contributed to the Juneau marine sport fishery from 24 April to 24 September 1989.

| Region                 | Agency <b>b</b> | Hatchery/<br>Release<br>Site | Tag Code     | 4/24-6/18          |                    |                               | 6/19-7/30          |                    |                               | Non-derby 7/31-9/24 |                    |                               | Derby <sup>a</sup> |                    |                               | Total              |                    |                               |    |
|------------------------|-----------------|------------------------------|--------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|---------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|----|
|                        |                 |                              |              | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup>  | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> |    |
| Oregon                 | ODFW            | Bonneville                   | 07-36-35     | ---                | ---                | ---                           | 1                  | 4                  | 11                            | ---                 | ---                | ---                           | ---                | 1                  | 1                             | 0                  | 1                  | 4                             | 11 |
|                        |                 |                              | 07-36-36     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | 1                             | 1                  | 0                  | 1                             | 1                  | 0                  |                               |    |
|                        |                 |                              | 07-38-25     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | 1                             | 2                  | 3                  | 1                             | 2                  | 3                  |                               |    |
|                        |                 | Marion Forks                 | 07-39-44     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | ---                | 1                  | 3                             | 7                  | 1                  | 3                             | 7  |
|                        |                 |                              |              | Oregon Total       | ---                | ---                           | ---                | 1                  | 4                             | 11                  | ---                | ---                           | ---                | 3                  | 7                             | 10                 | 4                  | 10                            | 21 |
| Washington             | WDF             | Cowlitz                      | 63-38-33     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 5                  | 18                            | 1                  | 5                  | 18                            |    |
|                        |                 | Washington Total             | ---          | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | 1                             | 5                  | 18                 | 1                             | 5                  | 18                 |                               |    |
| British<br>Columbia    | CDFO            | Kitimat River                | 02-42-21     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 2                  | 2                             | 1                  | 2                  | 2                             |    |
|                        |                 |                              | 02-45-39     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | 1                             | 6                  | 30                 | 1                             | 6                  | 30                 |                               |    |
|                        |                 | Puntledge River              | 02-41-03     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 3                  | 5                             | 1                  | 3                  | 5                             |    |
|                        |                 |                              | 02-47-20     | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 44                 | 1,920                         | ---                | ---                | ---                           | 1                  | 44                 | 1,920                         |    |
|                        |                 | Quinsam River                | 02-33-29     | ---                | ---                | ---                           | 1                  | 83                 | 6,921                         | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 83                 | 6,921                         |    |
| British Columbia Total |                 |                              |              | ---                | ---                | ---                           | 1                  | 83                 | 6,921                         | 1                   | 44                 | 1,920                         | 3                  | 11                 | 38                            | 5                  | 138                | 8,880                         |    |
| Southeast<br>Alaska    | ADF&G           | Crystal Lake                 | 04-23-21     | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 36                 | 1,297                         | ---                | ---                | ---                           | 1                  | 36                 | 1,297                         |    |
|                        |                 |                              | 04-25-31     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 8                  | 55                            | 1                  | 8                  | 55                            |    |
|                        |                 |                              | 04-25-40     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 2                  | 19                 | 162                           | 2                  | 19                 | 162                           |    |
|                        |                 |                              | 04-26-14     | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 21                 | 410                           | ---                | ---                | ---                           | 1                  | 21                 | 410                           |    |
|                        |                 |                              | 04-26-15     | 1                  | 25                 | 617                           | ---                | ---                | ---                           | 1                   | 23                 | 488                           | ---                | ---                | ---                           | 2                  | 48                 | 1,105                         |    |
|                        |                 |                              | 04-26-16     | ---                | ---                | ---                           | 1                  | 12                 | 134                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 12                 | 134                           |    |
|                        |                 |                              | 04-27-33     | 1                  | 12                 | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 12                 | ---                           |    |
|                        |                 |                              | 04-27-35     | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 31                 | 963                           | ---                | ---                | ---                           | 1                  | 31                 | 963                           |    |
|                        |                 |                              | 83-06-09     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |    |
|                        |                 |                              | 83-06-12     | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 7                  | 44                            | 2                  | 2                  | 0                             | 3                  | 9                  | 45                            |    |
|                        |                 | Deer Mountain                | 04-25-35     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |    |
|                        |                 |                              | 83-08-11     | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 30                 | 936                           | ---                | ---                | ---                           | 1                  | 30                 | 936                           |    |
|                        |                 |                              | Hidden Falls | 04-24-08           | 1                  | 8                             | 53                 | ---                | ---                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | ---                | 1                  | 8                             | 53 |
|                        |                 |                              | 04-24-11     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |    |
|                        |                 |                              | 04-27-25     | ---                | ---                | ---                           | 1                  | 11                 | 143                           | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 2                  | 12                 | 143                           |    |
|                        |                 |                              | 04-27-39     | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |    |
|                        |                 |                              | 04-34-63     | 1                  | 9                  | 70                            | ---                | ---                | ---                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 9                  | 70                            |    |

-(Continued)-

Appendix C18. (page 2 of 2)

| Region                             | Agencyb              | Hatchery/<br>Release<br>Site | Tag Code   | 4/24-6/18          |                    |                               | 6/19-7/30          |                    |                               | Non-derby 7/31-9/24 |                    |                               | Derby <sup>a</sup> |                    |                               | Total              |                    |                               |
|------------------------------------|----------------------|------------------------------|------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|---------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|
|                                    |                      |                              |            | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup>  | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> |
| Southeast<br>Alaska<br>(Continued) | ADF&G<br>(Continued) | Snettisham                   | 04-26-01   | 2                  | 44                 | 1,145                         | 2                  | 13                 | 79                            | ---                 | ---                | ---                           | 4                  | 11                 | 54                            | 8                  | 68                 | 1,278                         |
|                                    |                      |                              | 04-26-03   | ---                | ---                | ---                           | 5                  | 26                 | 114                           | ---                 | ---                | ---                           | 5                  | 6                  | 1                             | 10                 | 31                 | 114                           |
|                                    |                      |                              | 04-26-06   | 5                  | 48                 | 906                           | 1                  | 6                  | 33                            | 1                   | 4                  | 14                            | 5                  | 6                  | 1                             | 12                 | 64                 | 953                           |
|                                    |                      |                              | 04-26-07   | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 4                  | 4                  | 0                             | 4                  | 4                  | 0                             |
|                                    |                      |                              | 04-26-08   | ---                | ---                | ---                           | 1                  | 6                  | 30                            | ---                 | ---                | ---                           | 5                  | 16                 | 185                           | 6                  | 22                 | 215                           |
|                                    |                      |                              | 04-27-42   | ---                | ---                | ---                           | 1                  | 6                  | 29                            | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 6                  | 29                            |
|                                    |                      |                              | 04-27-44   | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                                    |                      |                              | 04-27-46   | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 2                  | 1                             | 1                  | 2                  | 1                             |
|                                    |                      |                              | 04-27-48   | 1                  | 6                  | 26                            | ---                | ---                | ---                           | 1                   | 5                  | ---                           | ---                | ---                | ---                           | 2                  | 10                 | 26                            |
|                                    |                      |                              | 04-27-50   | ---                | ---                | ---                           | 2                  | 11                 | 48                            | 1                   | 20                 | 429                           | 1                  | 1                  | 0                             | 4                  | 32                 | 477                           |
|                                    |                      |                              | 04-29-61   | 1                  | 5                  | 26                            | ---                | ---                | ---                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 5                  | 26                            |
|                                    |                      |                              | 04-30-03   | ---                | ---                | ---                           | 1                  | 13                 | 168                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 13                 | 168                           |
|                                    |                      |                              | 04-36-63   | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 7                  | ---                           | ---                | ---                | ---                           | 1                  | 7                  | ---                           |
|                                    |                      |                              | 04-51-63   | 1                  | 5                  | 23                            | ---                | ---                | ---                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 5                  | 23                            |
|                                    |                      |                              | 04-53-63   | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                                    |                      |                              | 04-55-63   | ---                | ---                | ---                           | 1                  | 7                  | 40                            | ---                 | ---                | ---                           | 2                  | 9                  | 59                            | 3                  | 16                 | 99                            |
|                                    |                      |                              | 04-56-63   | ---                | ---                | ---                           | 1                  | 18                 | 307                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 18                 | 307                           |
|                                    |                      |                              | 04-57-63   | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 1                  | 0                             | 1                  | 1                  | 0                             |
|                                    | NMFS                 | Little Port Walter           | 03-19-04   | 1                  | 5                  | 18                            | ---                | ---                | ---                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 5                  | 18                            |
|                                    |                      |                              | 03-19-10   | ---                | ---                | ---                           | 1                  | 4                  | 11                            | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 4                  | 11                            |
|                                    |                      |                              | 03-19-18   | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 6                  | 29                            | ---                | ---                | ---                           | 1                  | 6                  | 29                            |
|                                    |                      |                              | 03-19-41   | ---                | ---                | ---                           | 1                  | 4                  | 15                            | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 4                  | 15                            |
|                                    |                      |                              | 03-20-18   | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 7                  | 40                            | ---                | ---                | ---                           | 1                  | 7                  | 40                            |
|                                    |                      |                              | 03-20-19   | ---                | ---                | ---                           | 1                  | 30                 | 1,145                         | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 30                 | 1,145                         |
|                                    |                      |                              | 03-21-02R1 | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 6                  | 29                            | ---                | ---                | ---                           | 1                  | 6                  | 29                            |
|                                    | SSRAA                | Carroll Inlet                | 04-26-26R2 | ---                | ---                | ---                           | 1                  | 96                 | 9,127                         | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 96                 | 9,127                         |
|                                    |                      |                              | 04-26-26R4 | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 16                 | 232                           | 1                  | 16                 | 232                           |
|                                    |                      | Neets Bay                    | 04-26-32   | ---                | ---                | ---                           | ---                | ---                | ---                           | 1                   | 73                 | 5,348                         | 1                  | 18                 | 293                           | 2                  | 91                 | 5,641                         |
|                                    |                      |                              | 04-26-31R4 | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | ---                | ---                | ---                           |
|                                    |                      | Whitman Lake                 | 04-13-31   | ---                | ---                | ---                           | 1                  | 23                 | 491                           | ---                 | ---                | ---                           | ---                | ---                | ---                           | 1                  | 23                 | 491                           |
|                                    |                      |                              | 04-26-31R4 | ---                | ---                | ---                           | ---                | ---                | ---                           | ---                 | ---                | ---                           | 1                  | 2                  | 3                             | 1                  | 2                  | 3                             |
|                                    |                      | Southeast Alaska Total       |            | 15                 | 165                | 2,884                         | 24                 | 295                | 11,959                        | 14                  | 276                | 10,027                        | 43                 | 129                | 1,048                         | 96                 | 865                | 25,918                        |
|                                    |                      | All Regions Grand Total      |            | 15                 | 165                | 2,884                         | 26                 | 382                | 18,891                        | 15                  | 320                | 11,947                        | 50                 | 151                | 1,114                         | 106                | 1,019              | 34,837                        |

<sup>a</sup> Derby held on 4-6 August weekend.

<sup>b</sup> ODFW = Oregon Department of Fish and Wildlife

CDFO = Canadian Department of Fisheries and Oceans

NMFS = National Marine Fisheries Service

<sup>c</sup> Recov = Number of fish recovered of noted tag code.

<sup>d</sup> Contr = Estimated harvest of the release of the noted tag code.

<sup>e</sup> Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

WDF = Washington Department of Fisheries

ADF&G = Alaska Department of Fish and Game

SSRAA = Southern Southeast Regional Aquaculture Association

Appendix C19. Estimates of hatchery produced chinook salmon contributed to the Haines marine sport fishery from 24 April to 25 June 1989.

| Region                  | Agency <sup>a</sup> | Hatchery/<br>Release<br>Site | Tag Code | 24 April - 25 June |                    |                               | Total              |                    |                               |
|-------------------------|---------------------|------------------------------|----------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|
|                         |                     |                              |          | Recov <sup>b</sup> | Contr <sup>c</sup> | Var. of<br>Contr <sup>d</sup> | Recov <sup>b</sup> | Contr <sup>c</sup> | Var. of<br>Contr <sup>d</sup> |
| Southeast<br>Alaska     | ADF&G               | Crystal Lake                 | B3-06-11 | 1                  | 2                  | 4                             | 1                  | 2                  | 4                             |
|                         |                     |                              | B4-11-14 | 1                  | 6                  | 32                            | 1                  | 6                  | 32                            |
|                         |                     | Southeast Alaska Total       |          |                    | 2                  | 8                             | 36                 | 2                  | 8                             |
| All Regions Grand Total |                     |                              |          | 2                  | 8                  | 36                            | 2                  | 8                  | 36                            |

<sup>a</sup> ADF&G = Alaska Department of Fish and Game

<sup>b</sup> Recov = Number of fish recovered of noted tag code.

<sup>c</sup> Contr = Estimated harvest of the release of the noted tag code.

<sup>d</sup> Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix C20. Age composition of chinook salmon from select southeast Alaska sport fisheries, 1989.

| Sport<br>Fishery  |                    | Brood Year      |     |      |      |      |      |      |      |      |      |      | Sample<br>Size |     |
|-------------------|--------------------|-----------------|-----|------|------|------|------|------|------|------|------|------|----------------|-----|
|                   |                    | 1986            |     | 1985 |      | 1984 |      |      | 1983 |      |      | 1982 |                |     |
|                   |                    | 0.2             | 1.1 | 0.3  | 1.2  | 0.4  | 1.3  | 2.2  | 0.5  | 1.4  | 2.3  | 1.5  |                | 2.4 |
| <u>Ketchikan</u>  | Males              | n               |     |      | 4    | 6    |      | 9    |      | 4    |      |      |                | 23  |
|                   |                    | Percent         |     |      | 17.4 | 26.1 |      | 39.1 |      | 17.4 |      |      |                | 100 |
|                   |                    | SE <sup>a</sup> |     |      | 8.1  | 9.4  |      | 10.4 |      | 8.1  |      |      |                |     |
|                   | Females            | n               |     | 2    | 2    | 1    | 3    | 15   |      | 3    |      |      |                | 26  |
|                   |                    | Percent         |     | 7.7  | 7.7  | 3.8  | 11.5 | 57.7 |      | 11.5 |      |      |                | 100 |
|                   |                    | SE <sup>a</sup> |     | 5.3  | 5.3  | 3.8  | 6.4  | 9.9  |      | 6.4  |      |      |                |     |
|                   | Total <sup>b</sup> | n               | 47  | 8    | 39   | 83   | 24   | 227  |      | 69   | 1    | 2    |                | 500 |
|                   |                    | Percent         | 9.4 | 1.6  | 7.8  | 16.6 | 4.8  | 45.4 |      | 13.8 | 0.2  | 0.4  |                | 100 |
|                   |                    | SE <sup>a</sup> | 1.3 | 0.6  | 1.2  | 1.7  | 1.0  | 2.2  |      | 1.5  | 0.2  | 0.3  |                |     |
| <u>Petersburg</u> | Males              | n               |     |      | 1    |      | 5    | 13   |      | 8    |      | 6    |                | 33  |
|                   |                    | Percent         |     |      | 3.0  |      | 15.2 | 39.4 |      | 24.2 |      | 18.2 |                | 100 |
|                   |                    | SE <sup>a</sup> |     |      | 3.0  |      | 6.3  | 8.6  |      | 7.6  |      | 6.8  |                |     |
|                   | Females            | n               |     |      | 2    |      | 4    | 7    |      | 15   |      | 2    |                | 30  |
|                   |                    | Percent         |     |      | 6.7  |      | 13.3 | 23.3 |      | 50.0 |      | 6.7  |                | 100 |
|                   |                    | SE <sup>a</sup> |     |      | 4.6  |      | 6.3  | 7.9  |      | 9.3  |      | 4.6  |                |     |
|                   | Total <sup>b</sup> | n               | 1   | 1    | 13   | 3    | 34   | 87   |      | 3    | 54   | 18   | 1              | 215 |
|                   |                    | Percent         | 0.5 | 0.5  | 6.0  | 1.4  | 15.8 | 40.5 |      | 1.4  | 25.1 | 8.4  | 0.5            | 100 |
|                   |                    | SE <sup>a</sup> | 0.5 | 0.5  | 1.6  | 0.8  | 2.5  | 3.4  |      | 0.8  | 3.0  | 1.9  | 0.5            |     |
| <u>Wrangell</u>   | Males              | n               |     |      | 2    |      | 4    | 10   |      | 9    |      | 10   |                | 35  |
|                   |                    | Percent         |     |      | 5.7  |      | 11.4 | 28.6 |      | 25.7 |      | 28.6 |                | 100 |
|                   |                    | SE <sup>a</sup> |     |      | 4.0  |      | 5.5  | 7.7  |      | 7.5  |      | 7.7  |                |     |
|                   | Females            | n               |     |      | 8    | 1    | 9    | 27   |      | 1    | 50   | 3    |                | 99  |
|                   |                    | Percent         |     |      | 8.1  | 1.0  | 9.1  | 27.3 |      | 1.0  | 50.5 | 3.0  |                | 100 |
|                   |                    | SE <sup>a</sup> |     |      | 2.8  | 1.0  | 2.9  | 4.5  |      | 1.0  | 5.1  | 1.7  |                |     |
|                   | Total <sup>b</sup> | n               |     |      | 10   | 1    | 13   | 37   |      | 1    | 59   | 13   |                | 134 |
|                   |                    | Percent         |     |      | 7.5  | 0.7  | 9.7  | 27.6 |      | 0.7  | 44.0 | 9.7  |                | 100 |
|                   |                    | SE <sup>a</sup> |     |      | 2.3  | 0.7  | 2.6  | 3.9  |      | 0.7  | 4.3  | 2.6  |                |     |

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Appendix C20. (page 2 of 3)

| Sport<br>Fishery        |                    |                 | Brood Year |     |      |      |      |      |     |      |      |     | Sample<br>Size |      |     |
|-------------------------|--------------------|-----------------|------------|-----|------|------|------|------|-----|------|------|-----|----------------|------|-----|
|                         |                    |                 | 1986       |     | 1985 |      | 1984 |      |     | 1983 |      |     |                | 1982 |     |
|                         |                    |                 | 0.2        | 1.1 | 0.3  | 1.2  | 0.4  | 1.3  | 2.2 | 0.5  | 1.4  | 2.3 |                | 1.5  | 2.4 |
| <u>Sitka</u>            | Males              | n               |            |     | 1    | 1    |      |      |     |      |      |     |                | 2    |     |
|                         |                    | Percent         |            |     | 50.0 | 50.0 |      |      |     |      |      |     |                | 100  |     |
|                         |                    | SE <sup>a</sup> |            |     | 50.0 | 50.0 |      |      |     |      |      |     |                |      |     |
|                         | Females            | n               |            |     |      |      | 2    | 1    |     | 1    |      |     |                | 4    |     |
|                         |                    | Percent         |            |     |      |      | 50.0 | 25.0 |     | 25.0 |      |     |                | 100  |     |
|                         |                    | SE <sup>a</sup> |            |     |      |      | 28.9 | 25.0 |     | 25.0 |      |     |                |      |     |
|                         | Total <sup>b</sup> | n               | 4          |     | 41   | 1    | 117  | 27   |     | 2    | 53   |     | 2              | 247  |     |
|                         |                    | Percent         | 1.6        |     | 16.6 | 0.4  | 47.4 | 10.9 |     | 0.8  | 21.5 |     | 0.8            | 100  |     |
|                         |                    | SE <sup>a</sup> | 0.8        |     | 2.4  | 0.4  | 3.2  | 2.0  |     | 0.6  | 2.6  |     | 0.6            |      |     |
| <u>Juneau</u>           | Males              | n               | 7          | 1   | 10   | 24   | 3    | 48   |     | 1    | 8    |     | 2              | 104  |     |
|                         |                    | Percent         | 6.7        | 1.0 | 9.6  | 23.1 | 2.9  | 46.2 |     | 1.0  | 7.7  |     | 1.9            | 100  |     |
|                         |                    | SE <sup>a</sup> | 2.5        | 1.0 | 2.9  | 4.2  | 1.6  | 4.9  |     | 1.0  | 2.6  |     | 1.4            |      |     |
|                         | Females            | n               | 6          | 1   | 14   | 19   | 3    | 66   |     | 1    | 20   |     | 3              | 133  |     |
|                         |                    | Percent         | 4.5        | 0.8 | 10.5 | 14.3 | 2.3  | 49.6 |     | 0.8  | 15.0 |     | 2.3            | 100  |     |
|                         |                    | SE <sup>a</sup> | 1.8        | 0.8 | 2.7  | 3.0  | 1.3  | 4.4  |     | 0.8  | 3.1  |     | 1.3            |      |     |
|                         | Total <sup>b</sup> | n               | 34         | 5   | 43   | 92   | 8    | 177  | 1   | 3    | 38   |     | 7              | 408  |     |
|                         |                    | Percent         | 8.3        | 1.2 | 10.5 | 22.5 | 2.0  | 43.4 | 0.2 | 0.7  | 9.3  |     | 1.7            | 100  |     |
|                         |                    | SE <sup>a</sup> | 1.4        | 0.5 | 1.5  | 2.1  | 0.7  | 2.5  | 0.2 | 0.4  | 1.4  |     | 0.6            |      |     |
| <u>Juneau<br/>Derby</u> | Males              | n               | 5          | 1   | 15   | 13   | 1    | 10   |     |      | 1    |     |                | 46   |     |
|                         |                    | Percent         | 10.9       | 2.2 | 32.6 | 28.3 | 2.2  | 21.7 |     |      | 2.2  |     |                | 100  |     |
|                         |                    | SE <sup>a</sup> | 4.6        | 2.2 | 7.0  | 6.7  | 2.2  | 6.1  |     |      | 2.2  |     |                |      |     |
|                         | Females            | n               | 3          |     | 12   | 14   |      | 24   |     |      | 1    |     |                | 54   |     |
|                         |                    | Percent         | 5.6        |     | 22.2 | 25.9 |      | 44.4 |     |      | 1.9  |     |                | 100  |     |
|                         |                    | SE <sup>a</sup> | 3.1        |     | 5.7  | 6.0  |      | 6.8  |     |      | 1.9  |     |                |      |     |
|                         | Total <sup>b</sup> | n               | 20         | 1   | 48   | 53   | 1    | 57   |     |      | 4    |     |                | 184  |     |
|                         |                    | Percent         | 10.9       | 0.5 | 26.1 | 28.8 | 0.5  | 31.0 |     |      | 2.2  |     |                | 100  |     |
|                         |                    | SE <sup>a</sup> | 2.3        | 0.5 | 3.2  | 3.3  | 0.5  | 3.4  |     |      | 1.1  |     |                |      |     |

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Appendix C20. (page 3 of 3)

| Sport<br>Fishery |                    |                 | Brood Year |     |      |     |      |     |     |      |     |     | Sample<br>Size |      |     |
|------------------|--------------------|-----------------|------------|-----|------|-----|------|-----|-----|------|-----|-----|----------------|------|-----|
|                  |                    |                 | 1986       |     | 1985 |     | 1984 |     |     | 1983 |     |     |                | 1982 |     |
|                  |                    |                 | 0.2        | 1.1 | 0.3  | 1.2 | 0.4  | 1.3 | 2.2 | 0.5  | 1.4 | 2.3 |                | 1.5  | 2.4 |
| <u>Haines</u>    | Males              | n               |            |     | 2    |     | 8    |     |     | 9    |     | 2   |                | 21   |     |
|                  |                    | Percent         |            |     | 9.5  |     | 38.1 |     |     | 42.9 |     | 9.5 |                | 100  |     |
|                  |                    | SE <sup>a</sup> |            |     | 6.6  |     | 10.9 |     |     | 11.1 |     | 6.6 |                |      |     |
|                  | Females            | n               |            |     | 1    | 1   | 14   |     |     | 6    |     | 1   |                | 23   |     |
|                  |                    | Percent         |            |     | 4.3  | 4.3 | 60.9 |     |     | 26.1 |     | 4.3 |                | 100  |     |
|                  |                    | SE <sup>a</sup> |            |     | 4.3  | 4.3 | 10.4 |     |     | 9.4  |     | 4.3 |                |      |     |
|                  | Total <sup>b</sup> | n               |            |     | 3    | 1   | 22   |     |     | 15   |     | 3   |                | 44   |     |
|                  |                    | Percent         |            |     | 6.8  | 2.3 | 50.0 |     |     | 34.1 |     | 6.8 |                | 100  |     |
|                  |                    | SE <sup>a</sup> |            |     | 3.8  | 2.3 | 7.6  |     |     | 7.2  |     | 3.8 |                |      |     |

<sup>a</sup> Standard error in percent.

<sup>b</sup> Includes sexed and unsexed chinook salmon.

Appendix C21. Length at age in millimeters (from tip of snout to fork-of-tail), by sex, for chinook salmon from select southeast Alaska sport fisheries, 1989.

| Sport Fishery     |                    |      | Brood Year |     |      |     |      |     |     |      |       |     | Sample Size |      |     |
|-------------------|--------------------|------|------------|-----|------|-----|------|-----|-----|------|-------|-----|-------------|------|-----|
|                   |                    |      | 1986       |     | 1985 |     | 1984 |     |     | 1983 |       |     |             | 1982 |     |
|                   |                    |      | 0.2        | 1.1 | 0.3  | 1.2 | 0.4  | 1.3 | 2.2 | 0.5  | 1.4   | 2.3 |             | 1.5  | 2.4 |
| <u>Ketchikan</u>  | Males              | Mean |            |     | 899  | 745 |      | 859 |     |      | 1,007 |     |             |      |     |
|                   |                    | SE   |            |     | 17   | 19  |      | 30  |     |      | 40    |     |             |      |     |
|                   |                    | n    |            |     | 4    | 6   |      | 9   |     |      | 4     |     |             | 23   |     |
|                   | Females            | Mean |            | 575 | 777  | 781 | 986  | 883 |     |      | 932   |     |             |      |     |
|                   |                    | SE   |            | 5   | 36   |     | 21   | 15  |     |      | 25    |     |             |      |     |
|                   |                    | n    |            | 2   | 2    | 1   | 3    | 14  |     |      | 3     |     |             | 25   |     |
|                   | Total <sup>a</sup> | Mean | 713        | 529 | 827  | 731 | 990  | 862 |     | 971  | 900   | 942 |             |      |     |
|                   |                    | SE   | 7          | 40  | 14   | 6   | 13   | 5   |     | 10   |       | 55  |             |      |     |
|                   |                    | n    | 47         | 8   | 38   | 82  | 24   | 224 |     | 68   | 1     | 2   |             | 494  |     |
| <u>Petersburg</u> | Males              | Mean |            |     | 885  |     | 920  | 781 |     |      | 936   |     | 1,002       |      |     |
|                   |                    | SE   |            |     |      |     | 20   | 16  |     |      | 29    |     | 55          |      |     |
|                   |                    | n    |            |     | 1    |     | 5    | 13  |     |      | 8     |     | 6           | 33   |     |
|                   | Females            | Mean |            |     | 845  |     | 817  | 816 |     |      | 905   |     | 977         |      |     |
|                   |                    | SE   |            |     | 150  |     | 39   | 28  |     |      | 15    |     | 18          |      |     |
|                   |                    | n    |            |     | 2    |     | 4    | 7   |     |      | 15    |     | 2           | 30   |     |
|                   | Total <sup>a</sup> | Mean | 745        | 485 | 804  | 680 | 903  | 788 |     | 928  | 904   |     | 964         | 900  |     |
|                   |                    | SE   |            |     | 26   | 12  | 13   | 6   |     | 100  | 10    |     | 20          |      |     |
|                   |                    | n    | 1          | 1   | 13   | 3   | 34   | 86  |     | 3    | 54    |     | 18          | 1    |     |
| <u>Wrangell</u>   | Males              | Mean |            |     | 850  |     | 985  | 860 |     |      | 1,007 |     | 1,070       |      |     |
|                   |                    | SE   |            |     | 5    |     | 12   | 31  |     |      | 20    |     | 18          |      |     |
|                   |                    | n    |            |     | 2    |     | 4    | 10  |     |      | 9     |     | 10          | 35   |     |
|                   | Females            | Mean |            |     | 837  | 760 | 959  | 836 |     | 900  | 916   |     | 949         |      |     |
|                   |                    | SE   |            |     | 17   |     | 25   | 13  |     |      | 10    |     | 54          |      |     |
|                   |                    | n    |            |     | 8    | 1   | 9    | 27  |     | 1    | 50    |     | 3           | 99   |     |
|                   | Total <sup>a</sup> | Mean |            |     | 840  | 760 | 967  | 842 |     | 900  | 929   |     | 1,042       |      |     |
|                   |                    | SE   |            |     | 14   |     | 17   | 12  |     |      | 10    |     | 23          |      |     |
|                   |                    | n    |            |     | 10   | 1   | 13   | 37  |     | 1    | 59    |     | 13          | 134  |     |

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Appendix C21. (page 2 of 3)

| Sport<br>Fishery        |                    |      | Brood Year |     |      |     |      |     |       |       |       |       | Sample<br>Size |      |     |
|-------------------------|--------------------|------|------------|-----|------|-----|------|-----|-------|-------|-------|-------|----------------|------|-----|
|                         |                    |      | 1986       |     | 1985 |     | 1984 |     |       | 1983  |       |       |                | 1982 |     |
|                         |                    |      | 0.2        | 1.1 | 0.3  | 1.2 | 0.4  | 1.3 | 2.2   | 0.5   | 1.4   | 2.3   |                | 1.5  | 2.4 |
| <u>Sitka</u>            | Males              | Mean |            |     | 810  | 770 |      |     |       |       |       |       |                |      |     |
|                         |                    | SE   |            |     |      |     |      |     |       |       |       |       |                |      |     |
|                         |                    | n    |            |     | 1    | 1   |      |     |       |       |       |       |                |      | 2   |
|                         | Females            | Mean |            |     |      |     | 940  | 820 |       | 1,030 |       |       |                |      |     |
|                         |                    | SE   |            |     |      |     | 50   |     |       |       |       |       |                |      |     |
|                         |                    | n    |            |     |      |     | 2    | 1   |       | 1     |       |       |                |      | 4   |
| Total <sup>a</sup>      | Mean               | 710  |            | 836 | 770  | 963 | 887  |     | 1,069 | 1,027 |       | 1,062 |                |      |     |
|                         | SE                 | 0    |            | 11  |      | 7   | 16   |     | 35    | 10    |       | 68    |                |      |     |
|                         | n                  | 4    |            | 41  | 1    | 117 | 27   |     | 2     | 53    |       | 2     |                | 247  |     |
| <u>Juneau</u>           | Males              | Mean | 745        | 700 | 807  | 730 | 958  | 819 |       | 815   | 1,041 |       | 960            |      |     |
|                         |                    | SE   | 17         |     | 23   | 10  | 75   | 11  |       |       | 37    |       | 20             |      |     |
|                         |                    | n    | 7          | 1   | 10   | 24  | 3    | 48  |       | 1     | 8     |       | 2              |      | 104 |
|                         | Females            | Mean | 706        | 490 | 785  | 723 | 933  | 806 |       | 965   | 894   |       | 1,030          |      |     |
|                         |                    | SE   | 11         |     | 16   | 11  | 12   | 7   |       |       | 15    |       | 10             |      |     |
|                         |                    | n    | 6          | 1   | 14   | 19  | 3    | 66  |       | 1     | 20    |       | 3              |      | 133 |
|                         | Total <sup>a</sup> | Mean | 700        | 577 | 788  | 725 | 928  | 799 | 765   | 937   | 937   |       | 1,015          |      |     |
|                         |                    | SE   | 9          | 115 | 11   | 5   | 30   | 5   |       | 64    | 15    |       | 16             |      |     |
|                         |                    | n    | 34         | 4   | 43   | 92  | 8    | 176 | 1     | 3     | 38    |       | 7              |      | 406 |
| <u>Juneau<br/>Derby</u> | Males              | Mean | 701        | 700 | 795  | 729 | 905  | 821 |       |       | 870   |       |                |      |     |
|                         |                    | SE   | 14         |     | 15   | 10  |      | 18  |       |       |       |       |                |      |     |
|                         |                    | n    | 5          | 1   | 15   | 13  | 1    | 10  |       |       | 1     |       |                |      | 46  |
|                         | Females            | Mean | 725        |     | 795  | 753 |      | 791 |       |       | 835   |       |                |      |     |
|                         |                    | SE   | 35         |     | 17   | 19  |      | 11  |       |       |       |       |                |      |     |
|                         |                    | n    | 3          |     | 12   | 14  |      | 24  |       |       | 1     |       |                |      | 54  |
|                         | Total <sup>a</sup> | Mean | 710        | 700 | 790  | 735 | 905  | 796 |       |       | 897   |       |                |      |     |
|                         |                    | SE   | 12         |     | 10   | 7   |      | 8   |       |       | 34    |       |                |      |     |
|                         |                    | n    | 20         | 1   | 48   | 53  | 1    | 57  |       |       | 4     |       |                |      | 184 |

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Appendix C21. (page 3 of 3)

| Sport<br>Fishery |                    |      | Brood Year |     |      |     |      |     |     |      |     |       |      | Sample<br>Size |     |
|------------------|--------------------|------|------------|-----|------|-----|------|-----|-----|------|-----|-------|------|----------------|-----|
|                  |                    |      | 1986       |     | 1985 |     | 1984 |     |     | 1983 |     |       | 1982 |                |     |
|                  |                    |      | 0.2        | 1.1 | 0.3  | 1.2 | 0.4  | 1.3 | 2.2 | 0.5  | 1.4 | 2.3   | 1.5  |                | 2.4 |
| <u>Haines</u>    | Males              | Mean |            |     | 717  |     | 872  |     |     | 999  |     | 1,110 |      |                |     |
|                  |                    | SE   |            |     | 2    |     | 31   |     |     | 23   |     | 60    |      |                |     |
|                  |                    | n    |            |     | 2    |     | 8    |     |     | 9    |     | 2     |      | 21             |     |
|                  | Females            | Mean |            |     | 705  | 810 | 811  |     |     | 967  |     | 985   |      |                |     |
|                  |                    | SE   |            |     |      |     | 16   |     |     | 13   |     |       |      |                |     |
|                  |                    | n    |            |     | 1    | 1   | 14   |     |     | 6    |     | 1     |      | 23             |     |
|                  | Total <sup>a</sup> | Mean |            |     | 713  | 810 | 833  |     |     | 986  |     | 1,068 |      |                |     |
|                  |                    | SE   |            |     | 4    |     | 16   |     |     | 15   |     | 54    |      |                |     |
|                  |                    | n    |            |     | 3    | 1   | 22   |     |     | 15   |     | 3     |      | 44             |     |

<sup>a</sup> Includes sexed and unsexed chinook salmon.

Appendix C22. Numbers of coho salmon examined for coded-wire tags in southeast Alaska marine sport fisheries in 1989.

| Fishery     | Seasonal Period              | Coho Salmon |         |         |
|-------------|------------------------------|-------------|---------|---------|
|             |                              | Estimated   | Number  | Percent |
|             |                              | Harvest     | Sampled |         |
| Ketchikan   | 4/24-7/30                    | 2,963       | 292     | 10%     |
|             | 7/31-9/24                    | 7,818       | 1,142   | 15%     |
|             | Total                        | 10,781      | 1,434   | 13%     |
| Petersburg  | 4/10-7/16                    | 1           | 1       | 100%    |
| Wrangell    | 4/24-7/16                    | 0           | 0       | --      |
| Sitka       | 4/24-7/02                    | 104         | 7       | 7%      |
| Juneau      | 4/24-7/30                    | 2,894       | 476     | 16%     |
|             | Non-derby 7/31-9/24          | 16,218      | 2,669   | 16%     |
|             | Derby Entered <sup>a</sup>   | 2,166       | 1,975   | 91%     |
|             | Derby Take Home <sup>a</sup> | 1,007       | 137     | 14%     |
|             | Shelter Lodge                | 1,534       | 0       | 0%      |
|             | Total                        | 23,819      | 5,257   | 19%     |
| Haines      | 4/24-6/25                    | 0           | 0       | --      |
| Grand Total |                              | 34,705      | 6,699   | 19%     |

<sup>a</sup> Derby held on weekend 4-6 August 1989.

Appendix C23. Estimates of hatchery produced coho salmon contributed to the Ketchikan marine sport fishery from 24 April to 24 September 1989.

| Region              | Agency <sup>a</sup> | Hatchery/<br>Release<br>Site | Tag Code | 4/24-7/30          |                    |                               | 7/31-9/24          |                    |                               | Total              |                    |                               |
|---------------------|---------------------|------------------------------|----------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|
|                     |                     |                              |          | Recov <sup>b</sup> | Contr <sup>c</sup> | Var. of<br>Contr <sup>d</sup> | Recov <sup>b</sup> | Contr <sup>c</sup> | Var. of<br>Contr <sup>d</sup> | Recov <sup>b</sup> | Contr <sup>c</sup> | Var. of<br>Contr <sup>d</sup> |
| Southeast<br>Alaska | ADF&G               | Deer Mountain                | 04-26-63 | 4                  | 49                 | 392                           | ---                | ---                | ---                           | 4                  | 49                 | 392                           |
|                     |                     |                              | 04-27-53 | 10                 | 115                | 2,097                         | 7                  | 43                 | 246                           | 17                 | 159                | 2,343                         |
|                     |                     | Klawock                      | 04-27-41 | 1                  | 176                | 30,898                        | ---                | ---                | ---                           | 1                  | 176                | 30,898                        |
|                     | SSRAA               | Neets Bay                    | 04-29-04 | ---                | ---                | ---                           | 2                  | 143                | 10,933                        | 2                  | 143                | 10,933                        |
|                     |                     |                              | 04-30-57 | ---                | ---                | ---                           | 1                  | 357                | 127,328                       | 1                  | 357                | 127,328                       |
|                     |                     |                              | 04-30-61 | ---                | ---                | ---                           | 1                  | 191                | 36,308                        | 1                  | 191                | 36,308                        |
|                     |                     | Whitman Lake                 | 04-28-61 | ---                | ---                | ---                           | 2                  | 54                 | 1,484                         | 2                  | 54                 | 1,484                         |
|                     |                     |                              | 04-28-62 | ---                | ---                | ---                           | 1                  | 20                 | 372                           | 1                  | 20                 | 372                           |
|                     |                     |                              |          |                    |                    |                               |                    |                    |                               |                    |                    |                               |
|                     | Total               |                              |          | 15                 | 340                | 33,387                        | 14                 | 807                | 176,671                       | 29                 | 1,148              | 210,059                       |

<sup>a</sup> ADF&G = Alaska Department of Fish and Game

SSRAA = Southern Southeast Regional Aquaculture Association

<sup>b</sup> Recov = Number of fish recovered of noted tag code.

<sup>c</sup> Contr = Estimated harvest of the release of the noted tag code.

<sup>d</sup> Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix C24. Estimates of hatchery produced coho salmon contributed to the Juneau marine sport fishery from 24 April to 24 September 1989.

| Region              | Agency <sup>b</sup> | Hatchery/<br>Release<br>Site | Tag Code | 4/24-7/30          |                    |                               | Non-derby 7/31-9/24 |                    |                               | Derby <sup>a</sup> |                    |                               | Total              |                    |                               |
|---------------------|---------------------|------------------------------|----------|--------------------|--------------------|-------------------------------|---------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|--------------------|--------------------|-------------------------------|
|                     |                     |                              |          | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup>  | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of<br>Contr <sup>e</sup> |
| Southeast<br>Alaska | ADF&G               | Crystal Lake                 | 04-29-57 | ---                | ---                | ---                           | 1                   | 38                 | 1,392                         | ---                | ---                | ---                           | 1                  | 38                 | 1,392                         |
|                     |                     |                              | 04-27-30 | ---                | ---                | ---                           | 1                   | 12                 | 135                           | ---                | ---                | ---                           | 1                  | 12                 | 135                           |
|                     |                     | 04-29-46                     | ---      | ---                | ---                | 1                             | 86                  | 8,033              | ---                           | ---                | ---                | 1                             | 86                 | 8,033              |                               |
|                     |                     | 04-29-47                     | 1        | 25                 | 581                | 4                             | 123                 | 4,708              | 3                             | 18                 | 87                 | 8                             | 165                | 5,376              |                               |
|                     |                     | 04-29-48                     | ---      | ---                | ---                | 5                             | 74                  | 1,289              | 1                             | 3                  | 6                  | 6                             | 77                 | 1,295              |                               |
|                     |                     | 04-29-49                     | ---      | ---                | ---                | 1                             | 16                  | 241                | 2                             | 6                  | 12                 | 3                             | 22                 | 253                |                               |
|                     |                     | 04-29-50                     | ---      | ---                | ---                | 1                             | 30                  | 851                | 1                             | 60                 | 3,643              | 2                             | 90                 | 4,494              |                               |
|                     |                     | 04-29-51                     | ---      | ---                | ---                | ---                           | ---                 | ---                | 2                             | 3                  | 1                  | 2                             | 3                  | 1                  |                               |
|                     |                     | 04-31-53                     | ---      | ---                | ---                | 1                             | 9                   | 71                 | ---                           | ---                | ---                | 1                             | 9                  | 71                 |                               |
|                     |                     | 04-31-54                     | ---      | ---                | ---                | 1                             | 13                  | 147                | ---                           | ---                | ---                | 1                             | 13                 | 147                |                               |
|                     |                     | 04-31-55                     | ---      | ---                | ---                | 2                             | 59                  | 2,492              | ---                           | ---                | ---                | 2                             | 59                 | 2,492              |                               |
|                     |                     | B3-15-01                     | ---      | ---                | ---                | 1                             | 62                  | 3,788              | 1                             | 6                  | 33                 | 2                             | 68                 | 3,821              |                               |
|                     | DIPC                | Sheep Creek                  | 04-30-14 | 1                  | 5                  | 16                            | 20                  | 100                | 510                           | 1                  | 11                 | 114                           | 22                 | 115                | 640                           |
|                     |                     |                              | 04-30-15 | ---                | ---                | ---                           | 15                  | 167                | 1,934                         | 2                  | 5                  | 9                             | 17                 | 172                | 1,943                         |
|                     |                     |                              | Total    | 2                  | 29                 | 598                           | 54                  | 788                | 25,590                        | 13                 | 112                | 3,905                         | 69                 | 930                | 30,093                        |

- <sup>a</sup> Derby held on 4-6 August weekend.  
<sup>b</sup> ADF&G = Alaska Department of Fish and Game  
DIPC = Douglas Island Pink and Chum  
<sup>c</sup> Recov = Number of fish recovered of noted tag code.  
<sup>d</sup> Contr = Estimated harvest of the release of the noted tag code.  
<sup>e</sup> Var. of Contr = Variance of estimated harvest of the release of the noted tag code.

Appendix C25. Estimates of the number of wild coded-wire tagged coho salmon contributed to the Ketchikan and Juneau marine sport fisheries from 24 April to 24 September 1989.

| Sport Fishery | Agency <sup>b</sup> | Release Site    | Tag Code           | Non-derby 4/24-9/24 |                    |                            | Derby <sup>a</sup> |                    |                            | Total              |                    |                            |
|---------------|---------------------|-----------------|--------------------|---------------------|--------------------|----------------------------|--------------------|--------------------|----------------------------|--------------------|--------------------|----------------------------|
|               |                     |                 |                    | Recov <sup>c</sup>  | Contr <sup>d</sup> | Var. of Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of Contr <sup>e</sup> | Recov <sup>c</sup> | Contr <sup>d</sup> | Var. of Contr <sup>e</sup> |
| Ketchikan     | ADF&G               | Hugh Smith Lake | 04-29-24           | 1                   | 7                  | 43                         | ---                | ---                | ---                        | 1                  | 7                  | 43                         |
| Juneau        | CDFO                | Various         | 02-43-39           | 1                   | 5                  | 24                         | ---                | ---                | ---                        | 1                  | 5                  | 24                         |
|               |                     |                 | 02-43-46           | ---                 | ---                | ---                        | 1                  | 1                  | 0                          | 1                  | 1                  | 0                          |
|               |                     |                 | 02-48-22           | ---                 | ---                | ---                        | 4                  | 4                  | 0                          | 4                  | 4                  | 0                          |
|               | ADF&G               | Auke Lake       | 04-27-07           | 9                   | 54                 | 354                        | ---                | ---                | ---                        | 9                  | 54                 | 354                        |
|               |                     |                 | Tatsamenie L. B.C. | 04-26-47            | 1                  | 17                         | 290                | ---                | ---                        | ---                | 1                  | 17                         |
|               |                     |                 | 04-26-53           | 1                   | 4                  | 14                         | 1                  | 1                  | 0                          | 2                  | 5                  | 14                         |
|               |                     |                 | Yehring Creek      | 04-27-08            | 4                  | 25                         | 148                | 4                  | 4                          | 0                  | 8                  | 29                         |
|               |                     | 04-28-36        |                    | 1                   | 6                  | 28                         | ---                | ---                | ---                        | 1                  | 6                  | 28                         |
|               |                     | 04-28-55        |                    | 1                   | 13                 | 165                        | ---                | ---                | ---                        | 1                  | 13                 | 165                        |
| All Fisheries |                     |                 | Grand Total        | 19                  | 131                | 1,065                      | 10                 | 11                 | 1                          | 21                 | 142                | 1,067                      |

<sup>a</sup> Derby held on 4-6 August weekend in Juneau.

<sup>b</sup> ADF&G = Alaska Department of Fish and Game

CDFO = Canadian Department of Fisheries and Oceans

<sup>c</sup> Recov = Number of fish sampled of noted tag code

<sup>d</sup> Contr = Estimated number of recoveries of the noted tag code, not corrected for tagging fraction.

<sup>e</sup> Var. of Contr = Variance of estimated recoveries of the release of the noted tag code, not corrected for tagging fraction.